“Analysis of the Influence of Emotions in Preference Elicitation Methods. An Application for Health Economic Evaluation.”

TESIS DOCTORAL

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Analysis of the Influence of Emotions in Preference Elicitation Methods. An Application for Health Economic Evaluation.

A PhD Dissertation presented

by

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Science is exploration – exploration for the sake of exploration, and for nothing else. We must go where our curiosity leads us; we must go where we want to go. And eventually, it is sure to lead us to the beautiful, the important, and the useful.

Robert J. Aumann

The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2005

Lo bueno de este oficio y lo malo de este oficio es lo mismo: que si a uno no lo ciega o no lo entontece la vanidad, el resentimiento, la arrogancia, la pérdida de sentido de la realidad, está siempre empezando, de un modo u otro […].

Antonio Muñoz Molina

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Acronyms

AS	Ascending Sequence
BMS	Bare Metal Stents
CAPI	Computer Assisted Personal Interview
CV/VC	Contingent Valuation/Valoración Contingente
CI	Confident Interval
DB	Double Bounded
DES/SLF	Drug Eluting Stent/Stent Liberador de Fármacos
DPH	Discovered Preference Hypothesis
DS	Descending Sequence
HF	High Fear
LDCV	Learning Design Contingent Valuation
LF	Low Fear
MI	Myocardial Infarction
NOAA	National Oceanic and Atmospheric Administration
PCI	Percutaneous Coronary Intervention
PTCA	Percutaneous Transluminal Coronary Angioplasty
QALY/AVAC	Quality Adjusted Life Years/ Años de Vida Ajustados por Calidad
SB	Single Bounded
SD	Standard Deviation
SG	Standard Gamble
THS/EST	Temporary Health State/Estado de Salud Temporal
TTO	Time Trade-Off
VAS	Visual Analogue Scale
WTP/DAP	Willingness to Pay/Disposición a Pagar

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INTRODUCCIÓN

Esta Tesis compila, en tres capítulos, un análisis económico de la toma de decisiones utilizando la metodología de las preferencias declaradas con datos primarios obtenidos mediante una encuesta nacional destinada a elucidar las preferencias de los individuos con respecto a un beneficio en salud. La metodología de las preferencias declaradas permite obtener el valor de los denominados bienes de no-mercado, esto es, aquellos en los que no existe un mercado donde se puedan intercambiar.

Dentro de la metodología de las preferencias declaradas la técnica que se utiliza con más frecuencia es la Valoración Contingente (VC) (Mitchell and Carson, 1989). Esta técnica utiliza encuestas personales para obtener la disposición a pagar (DAP), o la disposición a aceptar (DAC), por un bien, así como para analizar los factores que pueden explicar su cuantía. Existen diversos factores que pueden influir en la DAP como, por ejemplo, las emociones que los individuos pueden experimentar en relación al bien de no-mercado objeto de la encuesta de VC. Este factor puede llegar a ser especialmente relevante en Economía de la Salud al tratarse de un contexto en el que existe un componente emocional importante en las preferencias de pacientes y usuarios, y en donde las preferencias de los individuos son empleadas para evaluar la utilidad en los análisis de coste-utilidad.

Esta Tesis contiene tres estudios sobre la influencia de las emociones en la toma de decisiones de los individuos en el campo de la Economía de la Salud. Así, se analizan varios aspectos del comportamiento económico individual utilizando las respuestas a una encuesta sobre DAP por un *stent* liberador de fármacos, un dispositivo cardíaco utilizado en las angioplastias para desbloquear las arterias obstruidas.

El primer capítulo, *Emotions and Willingness to Pay*, es un análisis sobre cómo las emociones pueden influir en las respuestas sobre DAP. El objetivo de este capítulo es comprobar en qué medida el miedo puede afectar a la DAP por los beneficios del *stent*, cuantificados como porcentajes de reducción en la probabilidad de restenosis. Esta influencia es estudiada desde una doble vertiente. Por un lado se estudia si existe variación en los valores de DAP entre individuos en función del nivel de miedo a la operación declarado. Por otro lado, se estudia si estos dos grupos de individuos muestran distinta sensibilidad a la variación en los niveles de beneficio que se valoran (*scope effects*).

El primer capítulo de la Tesis es uno de los pocos estudios que se han realizado sobre emociones y DAP utilizando datos primarios, obtenidos en una misma encuesta, sobre DAP por un beneficio en salud y emociones relacionadas con el bien que se está valorando.

El segundo capítulo de la Tesis, *The influence of fear and anxiety in learning and sequencing effects in preference elicitation*, es un análisis de la influencia de las emociones en el desempeño del modelo con formato dicotómico doble para la estimación de la DAP. El objetivo del capítulo es comprobar si existen los denominados efectos de aprendizaje (*learning effects*) cuya existencia ha sido identificada en un estudio con VC sobre mejoras en el bienestar de los animales en granjas (Bateman, 2008). El aprendizaje se definiría como la reducción en las diferencias en DAP obtenidas utilizando la primera respuesta, que es el modelo *Single Bounded* (SB); y utilizando la primera y segunda respuestas consideradas conjuntamente, modelo *Double Bounded* (DB).

Este estudio se realiza atendiendo a dos factores: el nivel del miedo a la operación declarado por los individuos encuestados y la secuencia en el orden de las preguntas. La encuesta está diseñada de manera que cada individuo valora cuatro beneficios diferentes, siendo preguntado por dos pagos en cada uno de ellos. Esto permite comprobar si las diferencias en DAP estimadas entre SB y DB se mantienen o varían a lo largo de los cuatro niveles de beneficio planteados y en función del nivel de miedo declarado por los individuos. Además no todos los individuos valoran los mismos beneficios sino que se crean dos tipos de encuesta diferentes, uno con una secuencia creciente en los beneficios y otro con una secuencia decreciente. El cuarto y último beneficio es el mismo para todos los individuos que participan en la encuesta. Esto permite estudiar la posible existencia de efectos de secuencia (*sequencing effects*) en los resultados obtenidos anteriormente.

El tercer capítulo de la Tesis, *Willingness to pay for avoiding angioplasty to implant a drug-eluting stent*, es un aplicación de la metodología de preferencias declaradas para la valoración de Estados de Salud Temporales (EST). Este estudio es pionero ya que utiliza la DAP como medida de la utilidad de evitar EST, cuando la metodología comúnmente utilizada es la de Años de Vida Ajustados por Calidad (AVACs) (Wright *et al*., 2009). El objetivo de este capítulo es comparar la DAP por evitar la angioplastia con el valor en AVAC obtenido en otros estudios, analizando además el impacto del miedo a la operación en la DAP.

La metodología AVAC es la utilizada para estudios de coste-utilidad donde la ganancia en salud (utilidad) se mide en el tiempo en un estado de salud con incapacidad que se evita debido a un tratamiento o, dicho de otra manera, el tiempo en buena salud que se gana. Este tiempo ganado, que pueden ser años, semanas o días, se expresa en su equivalente en años.

El caso de la evaluación de los EST es de especial importancia ya que estos estados son aquellos que duran menos de un año y la ganancia en salud por evitarlos, medida en AVACs, es muy baja. En los análisis coste-utilidad que se utilizan para comparar tratamientos que son más eficaces y más caros que los ya existentes, se obtiene el cociente coste/utilidad para cada uno de los tratamientos que entran en la comparativa, ordenándolos posteriormente atendiendo al incremento del coste por AVAC ganado. En algunos países de nuestro entorno se han establecido umbrales orientativos de coste utilidad para la financiación pública de tratamientos y, por ejemplo, no se financiarían tratamientos que superasen las 25,000-35,000£/AVAC en el Reino Unido, los 20,000-80,000€/AVAC en Holanda (Vemer and Rutten-van Mölken, 2011), los 50,000$/AVAC en EEUU y los 50,000$CAD /AVAC en Canadá (Einsenber, 2006). Estos intervalos para los umbrales superiores de coste-utilidad son tan amplios porque se consideran todo tipo de tratamientos, desde tratamientos preventivos, para los que se tomaría como umbral el valor inferior de los anteriores intervalos, hasta tratamientos para enfermedades de extrema gravedad para las que se establece el umbral más alto de coste-utilidad. Es fácil entender que el ratio coste-utilidad resulte elevado en el caso de tratamientos para evitar EST ya que el denominador del cociente, que mide la ganancia en AVACs, es muy bajo, por lo que para resultar por debajo del umbral de coste-utilidad el coste del tratamiento debería ser muy pequeño.

Para abordar este problema, en el tercer capítulo se emplea una aproximación distinta, estimando la DAP por evitar la angioplastia para implantar el *stent* y controlando por el nivel de miedo a esta operación declarado por los individuos. Para realizar este estudio se incluyeron en la encuesta de VC anteriormente mencionada, preguntas orientadas a estimar la DAP de los individuos por un tratamiento alternativo no invasivo que produjera los mismos resultados que la angioplastia. Las estimaciones de DAP son comparadas posteriormente con el valor de la utilidad medido en AVACs obtenidos en otros estudios.

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CHAPTER 1

EMOTIONS AND WILLINGNESS TO PAY

1.1 Introduction

The influence of emotions in individual preferences and the impact in choice and behaviour is subject of increasing interest in economics. Decisions are based on individual preferences and influenced by emotions, according to findings in the area of Psychology and Neuroscience (Chan and Andrade, 2010; Peters and Slovic, 2000; Vohs *et al*., 2007; Mellers, 2000; Kahneman, 2003; Damasio, 1994; Loewenstein and Lerner, 2002; Panksepp, 2004; Peters *et al*., 2006; Slovic *et al*., 2007; Zajonc, 1980 and 1998). In Neuroeconomics, a combination of Neuroscience and Economics methods, brain activity is analysed for economic decisions made under emotional circumstances (Phelps, 2009; Camerer *et al*., 2005; Cohen, 2005). In Behavioural Economics, psychologists and economists study how emotions influence choice and behaviour (Bechara *et al*., 1997; Diamond and Vartiainen, 2007; Rick and Loewenstein, 2008). Some authors have studied how emotions shape individual preferences in the areas of consumer behaviour (Ariely, 2009; Lee *et al*., 2009; Hermalin and Isen, 2008; Shiv and Fedorikhin, 1999), investment behaviour or economic transactions (Chan and Andrade, 2011;Shiv *et al*., 2005; Lerner *et al*., 2004) and preference stability in the context of policy evaluation (Araña and Leon, 2009; Bodenhausen *et al*., 2000; Bernheim and Rangel, 2007).

Preferences are elicited observing decision making behaviour and, in the case of non-market goods, preferences are analysed studying individual behaviour in related markets (revealed preference method) or in simulated markets (stated preference method). Using surveys, preferences for non-market goods are measured in monetary terms eliciting individuals' willingness to pay (WTP) for the good. Within the stated preferences methodology, the contingent valuation (CV) is the most frequent technique to obtain a monetary evaluation of non-market goods (Mitchell and Carson, 1989). CV analyses the individual trade-off between provision of a good and payment to estimate the individual maximum WTP for the non-market good (Bateman *et al*., 2002). Individuals WTP might be influenced by a number of factors, among them emotions related to the good being valued.

The influence of emotions is relevant in the evaluation of non-market goods such as health outcomes. Decision-making in the context of a health concern is normally emotionally-intensive and it should be expected that preferences in this field are strongly influenced by emotions. For instance, preferences for a health state when the individual feels fearful or anxious about it might be influenced by those feelings; in contrast to others without that emotional load. Emotions such as anxiety or embarrassment influence patient's preferences for treatments or screening tests (Elit *et al*., 1996; Sebban *et al*., 1995; Robbins *et al*., 2002, Yasunaga *et al*. 2007; Jonas *et al*. 2010).Therefore, WTP for an intervention that produces a health benefit might be influenced by emotions related to the health state being evaluated. The analysis of the influence of emotions in preferences for a health state is relevant since decisions on public or private health financing are based in economic evaluation of drugs and health technologies that apply stated preference methodology.

Studies eliciting WTP values for medical devices conclude that respondents are willing to pay for drugs that do not produce any health improvement as oral *vs*. injectable drugs, and that WTP is significantly explained by emotions such as anxiety associated with needles, (Matthews *et al*., 2001; Sadri *et al*., 2005). In addition, studies on WTP to reduce or eliminate diseases that produce an important burden in health-related quality of life refer to how distress is associated with preferences and WTP (O´Connor *et al.,* 1998, Lundbert *et al.*, 1999; Subak *et al*., 2006; Hu *et al*., 2010; Kleinman *et al*., 2002; Blumenschein and Johannesson, 1998; Lenert, 2003; Khanna *et al*., 2008).

The emotional load of caregivers influences WTP for treatments for Alzheimer (König *et al*., 2013; König and Wettstein, 2002; Gervès *et al*., 2013). Also, parents' preferences are strongly driven by emotions (Barron *et al*., 2004; Goldberg *et al*., 2009; Loomis *et al*., 2009) and influence their WTP for children's health benefit (Kuppermann *et al*., 2000; Liu *et al*., 2000; Meyerhoff *et al*., 2001).

There is poor evidence in the literature reviewed of studies using primary data on both WTP and individual's emotional load regarding the good being valued. In health economics, Araña *et al*. (2008) found that emotional individuals are less prone to take appropriate decisions in the context of health care evaluation. However, they use the Emotional Intensity Scale (EIS), an index on general well-being that is not directly related to the health status being evaluated.

To the author's knowledge only Lee *et al*. (1997) obtained data on WTP for autologous blood donation and dread for volunteers' blood transfusions. The authors found that irrational fears influence patients' WTP for an autologous blood transfusion concluding that an appropriate cost-effectiveness analysis of autologous blood donation would include the intangible benefits of avoiding patient's fear for allogeneic transfusions.

This chapter examines whether emotions such as fear or anxiety influence individual preferences. Using a CV survey, this study test whether individuals WTP for a coronary stent is different depending on their level of emotion. Individuals participating in the survey declared their level of fear and anxiety produced by the idea of undergoing heart-surgery. The objectives are to test whether individuals show different behaviour regarding WTP and response sensitivity to changes in benefit size (scope effects).

This chapter continues as follows, Section 1.2 presents the details of the survey that provided the data. Section 1.3 outlines the methodology to estimate WTP. Results and consistency tests are presented in Section 1.4 and discussed in Section 1.5.

1.2 Material and data

CV simulates a market where the individual state his/her preferences in relation to the provision of a non-market good at a given price. This simulated market is described in a questionnaire and given to representative sample of the population. Modelling respondents' answers, WTP for the non-market good is estimated.

As such, a questionnaire was designed where individuals chose whether they were willing to pay for a drug-eluting stent (DES), a cardiovascular device that reduces occlusions in arteries and prevent infarction (see Annex 1). The DES is inserted using a catheter in a non-invasive procedure denominated angioplasty. Some patients may suffer restenosis, which means the artery blocking again, and require new angioplasty within weeks or months (McBride *et al*., 1988). Latest research on stents' efficiency demonstrates that DESs reduce the risk of restenosis (Baumgart *et al*., 2007; Chan *et al*., 2005; Greenhalgh *et al*., 2010; Kelbaek *et al*., 2006; Suttorp *et al*., 2006).

Questionnaire

The questionnaire was divided in three main sections.

First section: General information

In the first section participants were informed about the objectives and nature of the study. The interviewer provided information about causes and symptoms of the artery occlusion and the angioplasty, and described the risk of restenosis and how placing a DESs reduces that risk. The description was facilitated with cards and drawings. Two types of stents were described, a bare-metal stent (BMS) and a DES, specifying that none of them guarantee zero risk of restenosis.

Second section: Evaluation task

An initial question on positive WTP to get a DES was included to identify those individuals having positive WTP. Individuals value the reduction in the probability of restenosis, therefore a negative WTP is not expected. Cost information was not provided in this point of the survey and the choice was made only considering the health benefit if DES was chosen over BMS. Individuals choosing not to pay for a DES did not continue with the questionnaire after this point.

Those with a positive WTP proceeded with the next section, an evaluation task consisting on a choice scenario with two attributes: health benefit and bid. In the computer's screen the interviewer showed a table with the percentage-point reduction in the probability of restenosis and explained that this reduction would mean moving from a probability of A (A patients out of 100) to a probability of B (B patients out of 100) having restenosis if DES was implanted, where B<A. Then s/he offered the bid and asked the participant if s/he would accept to pay that price for the DES. The respondent can accept the bid (Y), reject it (N) or not provide any answer (N/A). A second question follows with a second bid that is higher than the first one if the respondent has accepted it (bid_up) and is lower if s/he has rejected it (bid_down). Then, the evaluation task is repeated three more times with different health benefits.

The default option for those not accepting the bid is the *status quo,* being treated with a BMS at no cost. The payment vehicle if the participants accept to pay is one-payment at the moment of the decision in the hospital. In each evaluation task the values of the bid and the health benefit change. The values of the first bid are selected randomly from a set of bids. The bids were tested in a sample survey with 100 observations in order to meet two criteria: (i) the rank is wide enough to reflect the true WTP curve (ii) distribution's median is accurate to estimate a trend. Bids are shown in Table 1.1.

Table 1.1 Bids (€)

First_bid	*Follow-up bid*	
100	bid_{up}	400
	$bid_{\_down}$	30
400	bid_{up}	900
	$bid_{\_down}$	100
900	bid_{up}	1,500
	$bid_{\_down}$	400
1,500	bid_{up}	3,000
	$bid_{\_down}$	900
3,000	bid_{up}	6,000
	$bid_{\_down}$	1,500
6,000	bid_{up}	12,000
	$bid_{\_down}$	3,000
18,000	bid_{up}	30,000
	$bid_{\_down}$	12,000

As aforementioned, the questionnaire included four different health benefits. Not every patient that has undergone an angioplasty has the same probability to suffer restenosis. These health benefits were selected according to the literature. Patient with risk factors such as complicated lesions or diabetes show an average health benefit of 32 percentual points reduction in the probability of restenosis (Moses *et al.*, 2003), and for those with uncomplicated lesions, the reduction is 2 percentual points. This selection is consistent with a similar study by Greenberg *et al*. (2004).

There are two versions of the questionnaire differing exclusively in the order in which health benefits are presented. Version 1 of the questionnaire increases the benefit from an initial 2 percent to 7 percent, 12 percent and finally 17 percent. Version 2 decreases the benefit from an initial 32 percent in the first evaluation; to 27, 22 percent and finally 17 percent. Version 1 and 2 are randomly assigned to participants.

This section of the questionnaire includes the question “Does the idea of being operated causes you fear and/or anxiety?” which individuals responded using a Likert scale from 0 (no fear) to 10 (max fear).

Third section: Socio-economic information

Finally, information was collected on age, gender, schooling, occupation, family size and net disposable income and a few annotations on participant´s attitude and understanding.

Survey sample

The survey was conducted using a Computer Assisted Personal Interview (CAPI) methodology in February-April 2009. The sampling universe was population living in Spain older than 19 years old. Sampling procedure was as follows: primary sampling units were 108 municipalities selected from the 17 Spanish regions. Municipalities were selected to be representative of seven categories of habitat size: less than 2,000; 2,001-10,000; 10,001-50,000; 50,001-100,000; 100,001-400,000; 400,001-1,000,000, more than 1,000,000 residents. Secondary sampling units were houses selected with random routes. In-house selection was according to proportions based on gender and age. The survey sample size was 1,663.

1.3 Methodology

In the empirical exercise, individual is confronted with four different health benefits, in an ascending (AS) or descending sequence (DS). For each health benefit, the individual is asked if s/he is willing to pay an amount bid_1 for it. Three possible responses are provided: 'Y', 'N', 'N/A'. After this first question (q_1), the same question is asked again (q_2) but with a different bid (bid_2). The amount of this second bid will be higher (or lower) than bid_1 depending on whether the answer to this first question was Y (or N).

There are four possible cases: individual answers (i) 'Y' to both questions, (ii) 'N' to both questions, (iii) 'Y' to the first question and 'N' to the second one, and (iv) 'N' to the first question and 'Y' to the second one.

Double Bounded Model

The response to each bid will depend on the comparison between the individual's WTP and the bids. Assuming that individual's WTP for a health benefit *r* is the same in both questions, the probabilities for the four possible joint answers for the first and second questions can be obtained by applying the double bounded model (DB) (Hanemann *et al*., 1991).

Let's assume that the WTP for individual *i* (WTP_i) can be represented by equation (1), where *X* denotes a vector of relevant variables for the *ith* individual, β is a vector of coefficients, and ε_i is an error term following a normal distribution with a mean of 0 and a standard deviation of σ.

$$WTP_i = X\beta_i + \varepsilon_i \quad (1)$$

Under this framework, the probability of the sequences of two responses for individual *i* is given by:

(i.) q_1=Y, q_2=Y

$$\begin{aligned}\Pr(YY) &= \Pr(WTP_i > bid_1, WTP_i \geq bid_2) \\ &= \Pr(WTP_i \geq bid_2) \\ &= \Pr(X\beta_i + \varepsilon_i \geq bid_2) \\ &= \Pr(\varepsilon_i \geq bid_2 - X\beta_i) \\ &= 1 - \Phi\left(\frac{bid_2 - X\beta_i}{\sigma}\right).\end{aligned} \quad (2)$$

(ii.) q_1=N, q_2=N

$$\begin{aligned}\Pr(NN) &= \Pr(WTP_i < bid_1, WTP_i < bid_2) \\ &= \Pr(WTP_i < bid_2) \\ &= \Pr(X\beta_i + \varepsilon_i < bid_2) \\ &= \Pr(\varepsilon_i < bid_2 - X\beta_i) \\ &= \Phi\left(\frac{bid_2 - X\beta_i}{\sigma}\right).\end{aligned} \quad (3)$$

(iii.) q_1=Y, q_2=N

$$\Pr(YN) = \Pr(WTP_i \geq bid_1, WTP_i < bid_2)$$

$$= \Pr(bid_1 \leq WTP < bid_2)$$

$$= \Pr(bid_1 \leq X\beta_i + \varepsilon_i < bid_2) \qquad (4)$$

$$= \Pr\left(\frac{bid_1 - X\beta_i}{\sigma} \leq \frac{\varepsilon_i}{\sigma} < \frac{bid_2 - X\beta_i}{\sigma}\right)$$

$$= \Phi\left(\frac{bid_2 - X\beta_i}{\sigma}\right) - \Phi\left(\frac{bid_1 - X\beta_i}{\sigma}\right).$$

(iv.) q_1=N, q_2=Y

$$\Pr(NY) = \Pr(WTP < bid_1, WTP \geq bid_2)$$

$$= \Pr(bid_2 \leq WTP < bid_1)$$

$$= \Pr(bid_2 \leq X\beta_i + \varepsilon_i < bid_1) \qquad (5)$$

$$= \Pr\left(\frac{bid_2 - X\beta_i}{\sigma} \leq \frac{\varepsilon_i}{\sigma} < \frac{bid_1 - X\beta_i}{\sigma}\right)$$

$$= \Phi\left(\frac{bid_1 - X\beta_i}{\sigma}\right) - \Phi\left(\frac{bid_2 - X\beta_i}{\sigma}\right).$$

Estimates for $\left(\frac{1}{\sigma}\beta\right)$ and $-\frac{1}{\sigma}$ for each health benefit are obtained by applying maximum-likelihood estimation. The log-likelihood function for this model is:

$$\sum_{i=1}^{N}\left[I_i^{YY}\ln\left(1-\Phi\left(\frac{bid_2 - X\beta_i}{\sigma}\right)\right)+ \right.$$
$$I_i^{NN}\ln\left(\Phi\left(\frac{bid_2 - X\beta_i}{\sigma}\right)\right)+ \qquad (6)$$
$$I_i^{YN}\ln\left(\Phi\left(\frac{bid_2 - X\beta_i}{\sigma}\right)-\Phi\left(\frac{bid_1 - X\beta_i}{\sigma}\right)\right)+$$
$$\left. I_i^{NY}\ln\left(\Phi\left(\frac{bid_1 - X\beta_i}{\sigma}\right)-\Phi\left(\frac{bid_2 - X\beta_i}{\sigma}\right)\right)\right],$$

where I^{YY}, I^{NN}, I^{YN}, I^{NY} are indicator functions that equals one or zero depending on the two responses for each individual, and Φ is the standard normal cumulative density.

In order to study scope effects, the four DB responses were pooled in each sequence, regardless of health benefit, and added a health benefit covariate as explanatory variable in the model. In order to control for emotions, four different models were estimated, High Fear (HF) for individuals with high levels of fear related to the operation and Low Fear (LF) for those with low levels of fear, in AS and DS.

Random Effects Model

In order to capture the existence of unobserved heterogeneity a random effects probit model (REM) was also considered. This is a more flexible model where the error term ε_{it} is the sum of individual specific unobservable effect w_i and a random error term v_{it}, (Haab, 1997), and where i and t stand for the individual and the response, respectively. Both w_i and v_{it} follow a normal distribution with a mean of zero and a standard deviation of σ_w and σ_v, respectively. The individual, but constant through responses, error term allows for differences among individuals that cannot be explained by the independent variables. The error term v_{it} allows for differences across responses and individuals. This implies that the correlation between the error terms of successive responses for the same individual is given by,

$$\rho = corr(\varepsilon_{i,1}, \varepsilon_{i,2}) = \frac{\sigma_w^2}{\sigma_w^2 + \sigma_v^2}, \qquad (7)$$

where $\varepsilon_{i,1}$ and $\varepsilon_{i,2}$ are the error terms corresponding to the first and second response of individual *i*.

This correlation coefficient indicates correlation between the individual's WTP in the first and the second response. In the DB specification, both responses are constrained to be from the same WTP distribution, being the correlation coefficient between the two responses equals to one. However, in REM, this constrain is relaxed by allowing the correlation coefficient to capture the degree of correlation between both responses. In REM, each individual bases both responses on a WTP with the same mean, but the actual WTP used by the individual in each payment question is subject to a random error.

Under the random-effects specification, the probabilities of the responses provided by an individual to the two payment questions for a specific risk reduction are given by:

(i.) q_1=Y, q_2=Y

$$\begin{aligned} \Pr(YY) &= \Pr(WTP_{i1} > bid_1, WTP_{i2} \geq bid_2) \\ &= \Pr(X\beta_i + \varepsilon_{i1} > bid_1, X\beta_i + \varepsilon_{i2} \geq bid_2). \end{aligned} \qquad (8)$$

(ii.) q_1=N, q_2=N

$$\Pr(NN) = \Pr(WTP_{i1} < bid_1, WTP_{i2} < bid_2) \tag{9}$$
$$= \Pr(X\beta_i + \varepsilon_{i1} < bid_1, X\beta_i + \varepsilon_{i2} < bid_2).$$

(iii.) q_1=Y, q_2=N

$$\Pr(YN) = \Pr(WTP_{i1} \geq bid_1, WTP_{i2} < bid_2) \tag{10}$$
$$= \Pr(X\beta_i + \varepsilon_{i1} \geq bid_1, X\beta_i + \varepsilon_{i2} < bid_2).$$

(iv.) q_1=N, q_2=Y

$$\Pr(NY) = \Pr(WTP_{i1} < bid_1, WTP_{i2} \geq bid_2) \tag{11}$$
$$= \Pr(X\beta_i + \varepsilon_{i1} < bid_1, X\beta_i + \varepsilon_{i2} \geq bid_2).$$

The log-likelihood function for this model takes the form:

$$\sum_{i=1}^{N}\left[I_i^{YY}\ln\left(\Pr(YY)\right) + I_i^{NN}\ln\left(\Pr(NN)\right) + I_i^{YN}\ln\left(\Pr(YN)\right) + I_i^{NY}\ln\left(\Pr(NY)\right)\right]. \tag{12}$$

In the case of REM, scope effects are studied by pooling the eight responses to the payment questions provided by each individual (two payment questions for each health benefit, and four different health benefits), and adding as explanatory variable a variable representing health benefits. Therefore, four different models were obtained, HF and LF for the AS and DS.

WTP estimation

From these parameters, the mean WTP for each health benefit *r* is given by:

$$E\left(WTP_r\right) = \bar{X}'\beta_r,$$

where $\bar{X}$ is the average of the variables included in *X*. In order to make comparisons between WTP estimates, these averages have been computed considering the whole sample. This way, mean WTP estimates for the different health benefits are estimated for an average individual of the whole sample.

1.4 Results

Sample population is representative of the Spanish population; socioeconomic characteristics of sample and Spanish populations are shown in Table 1.2. Final sample size was 1,479 distributed in Version 1 (N=716) and in Version 2 (N=763) of the questionnaire. There were no responses on WTP from 149 individuals that were not willing to pay for a DES. The most common cause to reject a DES was fear to the drugs that it elutes. Observations of 35 individuals that did not provide information on age, employment status or answered “N/A” to a bid were not considered.

In order to study the effect of fear to angioplasty declared by participants on WTP, individuals were classified as HF when their declared level of anxiety and fear was 8 or more in a Likert scale (N=729), and as LF when the score was 7 or less (N=750).

Table 1.2 Socioeconomic characteristics. Survey and Spanish populations		
Variables	Sample population (N=1,479)	Spain (2009)
Age[1]		
20-34	29.5	28.3
35-49	28.3	29.9
50-64	22.5	21.5
65+	19.6	20.3
Gender[2]		
(% female)	50.7	50.6
Level of studies[3]		
Compulsory education	37.9	23.1
1st level Secondary	34.5	27.5
2nd level Secondary	8.3	21.0
Higher Education	19.2	28.5
Employment[4]		
Employed	59.9	60.1
Unemployed	40.1	39.8
HH average size[5]		
Number of individuals	3.1	2.9
Net HH income[6]		
Up to 1,200€	39.6	45
From 1,201 to 3,000€	55.3	51.2
More than 3,000€	5.1	3.8

[1,2] Estimations from Census, January 2009. (*Padrón Municipal*)
[3] Data from the Ministry of Education (*Sistema Estatal de Indicadores en Educación*) http://www.institutodeevaluacion.mec.es/contenidos/pdfs/c4_2007.pdf
[4] Employment Survey. (*Encuesta de Población Activa*) First Quarter 2009.
[5] Household Budget Survey,(*Encuesta de Presupuestos Familiares*), 2005.
[6] Income Survey (*Encuesta de Estructura Salarial*), 2006.
Source: [1,2,4,5 and 6]: National Institute of Statistics. *INE (http://www.ine.es)*

In order to control for differences in the composition of the sub-samples, a number of covariates were included in the WTP function: age (number of years), gender (male/female), education (years of study) and laboral status (employed/unemployed). The distribution of these variables in the four groups is rather similar for covariates age, education and laboral status (see Table 1.3). The distribution of gender is unequal when individuals are distributed in groups according to their level of fear. HF groups show a higher presence of female respondents (58%), in contrast to LF groups (41-44%).

Table 1.3 Covariates distribution, by group				
	LF-A (351)	LF-D (399)	HF-A (365)	HF-D (364)
Age (average)	45.4	46.5	48.3	47.7
Gender (% female)	44.4	41.1	58.9	58.5
Years of study (average)	9.7	9.7	9.2	9.6
Laboral Status (% employed)	58.1	61.7	59.2	61.8

Double Bounded Model

Mean WTP obtained using the DB model for each health benefit are shown in Table 1.4. WTP is estimated for the average individual of the total sample.

The 95% confidence intervals (CI) reported in Table 1.4 for the DB model, were calculated with 1,000 random draws following the Krinsky-Robb procedure (Krinsky and Robb, 1986). This procedure uses random draws from the estimated asymptotic normal distribution of parameter estimates to calculate numerous estimates of WTP. From these estimates, the 1- α % CI can be computed by sorting the resulting WTP estimates in ascending order and dropping the $\alpha/2$ and the $(1-\alpha/2)$ percentiles of the sorted distribution (Haab and McConnell, 2002).

As expected, the higher the health benefits the higher WTP estimates. Results obtained with the DB model show that for the LF group, WTP for the lowest health benefit is 2,138.58€ (valuation of 2%) and for the highest is 9,686.00€ (32%). On the other hand, in the HF group WTP amounts rank from 7,362.24€ (2%) to 13,317.21€ (32%).

Table 1.4 Mean WTP and CI, DB model (N=1,479)		
Health Benefit	LF (N=351)	HF (N=365)
2	*Log likelihood (-412.042)* 2,138.58 (851.74 3,386.61)	*Log likelihood (-441.650)* 7,362.24 (5,936.21 8,896.99)
7	*Log likelihood (-449.543)* 4,748.44 (3,630.45 5,901.67)	*Log likelihood (-422.546)* 7,776.27 (6,585.87 9,166.86)
12	*Log likelihood (-466.405)* 5,992.15 (4,877.47 7,154.46)	*Log likelihood (-426.619)* 9,622.53 (8,243.3335 11,118.5828)
17	*Log likelihood (-432.502)* 7,173.67 (5,949.68 8,553.30)	*Log likelihood (-426.630)* 9,686.00 (8,338.65 11,061.88)
Health Benefit	LF (N=399)	HF (N=364)
32	*Log likelihood (-488.240)* 9,491.46 (8,005.00 11,198.18)	*Log likelihood (-382.134)* 13,317.21 (11,577.53 15,289.11)
27	*Log likelihood (-487.669)* 8,152.67 (6,803.69 9,585.93)	*Log likelihood (-419.251)* 12,597.82 (10,833.12 14,426.58)
22	*Log likelihood (-469.687)* 7,514.32 (6,161.22 8,889.33)	*Log likelihood (-382.407)* 12,459.97 (10,715.45 14,493.60)
17	*Log likelihood (-475.061)* 7,015.48 (5,822.44 8,411.43)	*Log likelihood (-421.737)* 12,130.90 (10,341.73 14,010.95)

In Version 1 of the survey, the HF/LF ratio in the initial evaluation of 2 percentual-point reduction in the probability of restenosis is 3.44. These differences between HF and LF groups persist along the evaluation task showing a decreasing pattern to 1.63, 1.60 and 1.35 in the three consecutive evaluations for 7, 12 and 17 percentual-point reductions. In Version 2 of the survey, the HF/LF ratio is 1.40 for the initial evaluation (32%) and these differences increase with evaluation to 1.54, 1.65 and 1.73 for evaluations of 27, 22 and 17 percentual-point reductions. Test for statistical significance of these differences (Poe *et al*., 1997) are presented in Table 1.5.

Table 1.5 Differences in mean WTP, HF *vs*. LF. DB model	
Health Benefit	**LF-HF**
2	5,217.49 (0.000)
7	3,011.18 (0.000)
12	3,678.06 (0.000)
17	2,487.58 (0.005)
32	3,885.28 (0.000)
27	4,391.22 (0.000)
22	5,029.65 (0.000)
17	5,080.32 (0.000)

Absolute differences in WTP between LF and HF respondents for each level of health benefit, show opposite trends in AS and DS. In the AS the initial evaluation (2%) produces the highest difference in WTP between HF and LF groups, 5,217.49€. This difference decreases with the evaluation tasks and, in the final question (17%) the difference in mean WTP between HF and LF is 2,487.58€, less than half of the difference initially shown by respondents. For the DS, differences in WTP values between the HF and LF groups increase with each question. The initial WTP difference is 3,885.27€ (32%), this difference then gradually increases up to a difference of 5,080.33€ for the final evaluation (17%).

These differences in WTP measures between HF and LF groups are statistically significant at a 1% level. Individuals in the HF group tend to provide significantly higher WTP estimates for each health benefit.

Linear Health Benefits in the DB model

Differences in the responsiveness of WTP to changes in the health benefits are tested pooling the observations for each health benefit by sequence and re-estimating the DB model adding health benefits as a continuous variable. The results for the four groups created: LF and HF in ascending sequence (LF-AS) and (HF-AS); and LF and HF in descending sequence, (LF-DS) and (HF-DS) are shown in Table 1.6. WTP estimates refer to an average individual of the total sample.

Table 1.6 Parameter and mean WTP estimates with health benefit as linear variable, DB model

Covariates	LF-AS (N=351)		LF-DS (N=399)		HF-AS (N=365)		HF-DS (N=364)	
	Parameter	p-value	Parameter	p-value	Parameter	p-value	Parameter	p-value
Constant	-0.4942	0.004	-0.4500	0.032	0.7850	0.000	0.4789	0.039
Bid	-0.1122	0.000	-0.0903	0.000	-0.0983	0.000	-0.0824	0.000
Age	0.0031	0.161	0.0065	0.002	-0.0037	0.102	-0.0013	0.575
Gender	0.1333	0.042	-0.1913	0.002	-0.2170	0.001	0.3092	0.000
Laboral status	0.2845	0.000	0.2495	0.000	0.0285	0.721	0.0635	0.423
Education	0.0351	0.000	0.0504	0.000	0.0161	0.062	0.0281	0.001
Health benefit	0.0360	0.000	0.0134	0.014	0.0185	0.001	0.0066	0.262
Health Benefits	WTP							
2	2,629.57				7,251.12			
7	4,234.15				8,189.48			
12	5,838.73				9,127.85			
17	7,443.31		6,905.87		10,066.22		12,005.74	
22			7,649.51				12,408.18	
27			8,393.14				12,810.62	
32			9,136.78				13,213.06	

The role of covariates to explain bid acceptance differs between groups. All covariates that result statistically significant for the HF group are also significant for the LF group. Education is positively correlated to bid-acceptance in the four groups and statistically significant at 1% for all groups, except in HF-AS where it is statistically significant at 10% level (p=0.0621). Gender is statistically significant at 1% in all groups, except for LF-AS where is statistically significant at 5%. The direction of the relation changes with the sequence and the level of fear for angioplasty declared by participants. Gender is positively related with bid-acceptance in LF-AS and HF-DS, and negatively related in the other two groups. Laboral status shows a positive relation with bid acceptance and is statistically significant at 1% level (p=0.000) for LF groups, and is not statistically significant for HF groups.

Finally, health benefit is statistically significant and positively related to bid-acceptance except for HF-DS. This requires further analysis on sensitivity of responses to changes in the magnitude of health benefits.

Scope Effects

Table 1.7 shows results on the marginal utility of health benefit, defined as the slope of the WTP curve for a percentual-point reduction in the probability of restenosis, controlling for sequence and level of fear declared by respondents. The table includes CI and coefficients of Wald tests for the WTP curve slopes. It also includes Poe tests for differences in slope between LF and HF individuals.

Table 1.7 Slope in WTP curves. DB model							
Health benefit	LF (N=750)			HF (N=729)			Poe test $H_0: Slope_{LF} = Slope_{HF}$ $H_1: Slope_{LF} > Slope_{HF}$
	Slope	95% confidence interval*	Wald test $H_0: Slope = 0$ $H_1: Slope \neq 0$	Slope	95% confidence interval*	Wald test $H_0: Slope = 0$ $H_1: Slope \neq 0$	
2-17	320.91	(218.81 424.92)	6.239 (0.000)	187.67	(78.19 303.75)	3.231 (0.001)	(0.046)
32-17	148.72	(29.86 274.30)	2.456 (0.014)	80.48	(-58.59 226.02)	1.112 (0.266)	(0.258)

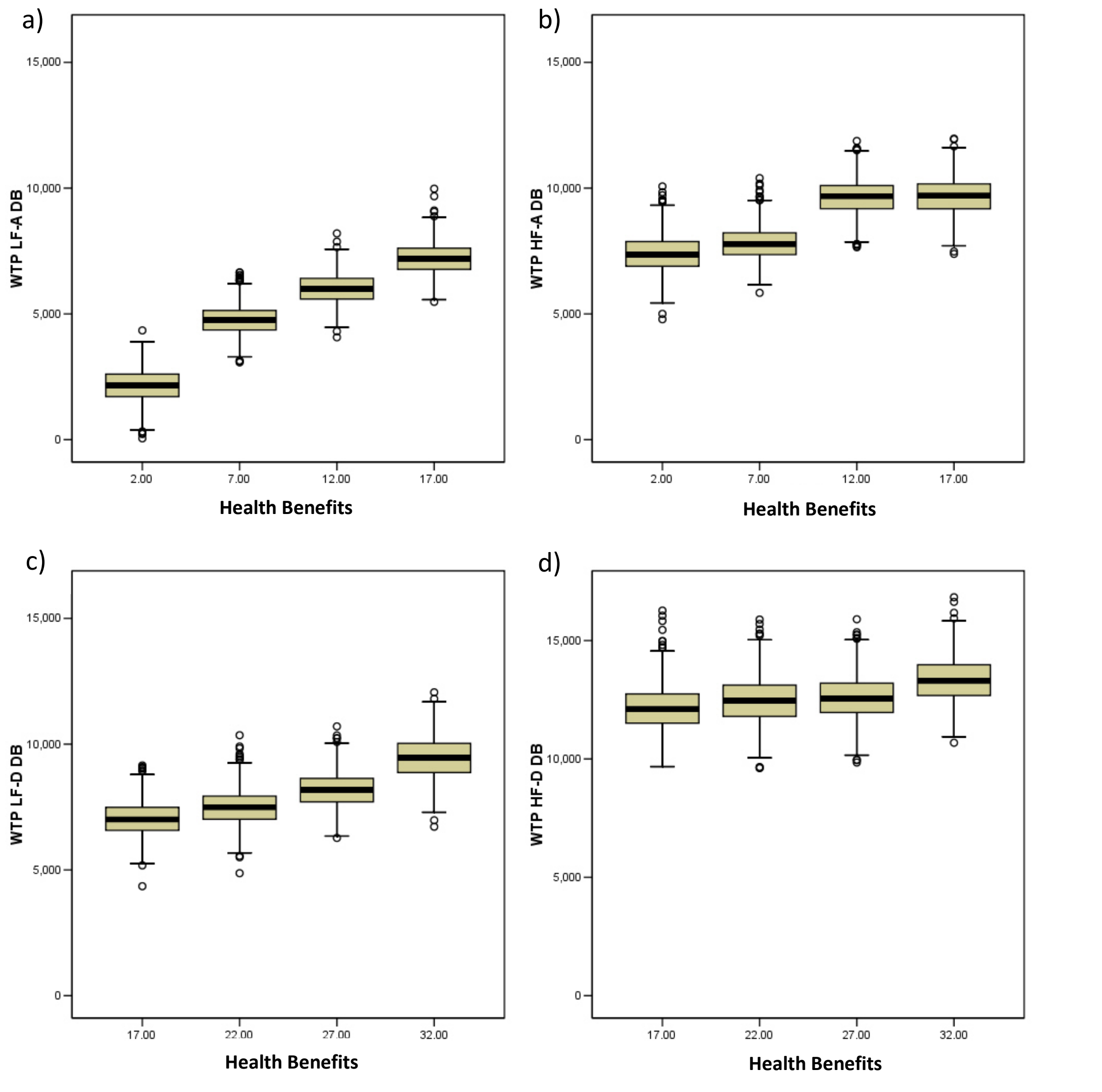
*obtained from 1,000 Krinsky-Robb draws (Krinsky and Robb, 1986)

In the DB model the slopes in WTP curve are significantly different from zero for the LF group and for the HF-AS group; the slope of the WTP curve is not significantly different from zero for the HF-DS.

Poe test indicates that the slope for the LF group is significantly higher than the slope in the HF group in AS. However, in DS the null hypothesis of equal slopes in LF and HF is accepted.

Boxplot figures on WTP estimates, obtained from 1,000 Krinsky-Robb draws, for each level of health benefit are included. This graphic provides information on the maximum and minimum WTP, 95% CI and the median. The non-rejection of the null hypothesis (H_0: slope=0) for the HF-DS group can be observed in Figure 1.1 (d). In this case, the trend of boxes showing 95% CI for each level of health benefit evaluated is quite flat.

Figure 1.1 Distribution of responses for health benefits, DB model



Random Effects Model

Mean WTP estimates and CI using the REM are shown in Table 1.8. Results obtained with the REM show that WTP increases for ascending values of health benefit. As such, in the LF group, WTP for an initial evaluation (2%) is 2,549.34€ and it increases to 7,926.03€ (17%). A similar trend is observed in DS. The initial evaluation (32%) is 9,806.02€ and the final evaluation (17%) declines up to 7,483.81€.

Table 1.8 Mean WT and CI, REM (N=1,479)		
Health Benefit	LF (N=351)	HF (N=365)
2	*Log likelihood (-1261.221)* 2,549.34 (1,210.7 3,808.7)	*Log likelihood (-1273.050)* 7,454.41 (6,217.2 8,792.0)
7	*Log likelihood (-1261.221)* 5,168.49 (3,367.0 8,076.2)	*Log likelihood (-1273.050)* 8,461.94 (6,172.7 11,087.6)
12	*Log likelihood (-1261.221)* 6,866.94 (4,961.4 8,874.8)	*Log likelihood (-1273.050)* 10,221.37 (8,085.0 12,207.0)
17	*Log likelihood (-1261.221)* 7,926.03 (6,217.2 10,469.8)	*Log likelihood (-1273.050)* 10,368.14 (8167.2 12874.8)
Health Benefit	LF (N=399)	HF (N=364)
32	*Log likelihood (-1293.878)* 9,806.02 (8,462.4 11,201.5)	*Log likelihood (-1040.742)* 12,765.10 (11,708.2 14,009.4)
27	*Log likelihood (-1293.878)* 8,721.69 (6,431.7 11,174.8)	*Log likelihood (-1040.742)* 12,142.82 (10,561.3 13,770.5)
22	*Log likelihood (-1293.878)* 7,867.16 (5,491.3 10,901.8)	*Log likelihood (-1040.742)* 11,826.02 (10347.8 13515.5)
17	*Log likelihood (-1293.878)* 7,483.81 (5,322.9 10,020.7)	*Log likelihood (-1040.742)* 11,814.04 (10,003.3 14,172.4)

WTP results for the same health benefit are higher in the HF groups than in LF groups. As such, WTP value is 7,454.41€ (2%) and increases to 10,368.14€ (17%). In DS WTP measures are 12,765.10€ (32%) and 11,814.04€ (17%).

The HF/LF ratio for the initial evaluation (2%) is 2.92. This ratio decreases to 1.64, 1.48 and 1.31 in the consecutive valuation tasks of 7, 12 and 17 percentual-points reduction in the risk of restenosis. The ratio increases when mean WTP for health benefits decreases. These HF/LF discrepancies are also present in the DS and HF/LF ratio is 1.30 in the initial evaluation (32%). In the evaluation of 27, 22 and 17 percentual-point reductions the HF/LF ratio is 1.39, 1.50 and 1.57 in that order.

Differences in mean WTP between LF and HF groups are statistically significant throughout the evaluation task. Tests for statistical significance of differences between HF and LF evaluations are shown in Table 1.9.

Table 1.9 Differences in mean WTP, REM

Health Benefit	**LF-HF**
2	4,920.41 (0.000)
7	3,286.10 (0.000)
12	3,370.20 (0.000)
17	2,532.06 (0.005)
32	2,968.20 (0.000)
27	3,382.01 (0.001)
22	3,949.97 (0.000)
17	4,293.96 (0.000)

Linear Health Benefits in REM

Results of REM with health benefit as a linear covariate are shown in Table 1.10. Covariates health benefit, education and laboral status are statistically significant for the LFgroup, and are positively related with bid acceptance and WTP. The portion of the model variance accounted for by individual variation is significant at 1% level. Therefore, responses of the same individual are significantly correlated in LF group.

Table 1.10 Parameter and mean WTP estimates with health benefit as linear variable, REM (N=1479)

Covariates	LF-AS (N=351)		LF-DS (N=399)		HF-AS (N=365)		HF-DS (N=364)	
	Parameter	p-value	Parameter	p-value	Parameter	p-value	Parameter	p-value
Constant	-1.0841	.056	-1.1578	.133	1.3811	.032	1.4105	.042
Bid	-.1980	.000	-.2225	.000	-.2002	.000	-.2958	.000
Age	.0068	.343	.0156	.116	-.0037	.640	-.0018	.836
Gender	.3208	.176	-.3682	.204	-.4540	.061	1.4447	.000
Laboral status	.6635	.016	.6228	.057	.0974	.734	.2260	.500
Education	.0675	.032	.1322	.000	.0402	.241	.1005	.004
Health benefit	.0705	.000	.0346	.000	.0421	.000	.0186	.003
ρ	.7896	.000	.8689	.000	.8034	.000	.9240	.000
Health benefit	WTP							
2	2,950.95				7,535.39			
7	4,733.18				8,588.74			
12	6,515.40				9,642.09			
17	8,297.62		7,300.24		10,695.44		11,670.27	
22			8,078.73				11,984.97	
27			8,857.22				12,299.68	
32			9,635.71				12,614.38	

For the HF group, bid and health benefit are statistically significant at 1% to explain bid acceptance and WTP. Gender is statistically significant at 1% for HF-DS and at 5% for HF-AS. Age, laboral status and education are not significantly related to WTP. The portion of the model variance accounted for by individual variation is significant at 1% level, indicating that the responses from the first to the eighth question are correlated.

In summary, for REM with health benefit as a linear covariate, bid and health benefit is always statistically significant at 1%. Age is not statistically significant in the four groups. Gender is statistically significant in the HF group but has a negative impact in AS and positive and quite important relation in DS. Laboral status is significant in the LF groups and not in HF. Education is not significant in HF-DS. Finally, variance in WTP estimates accounted for by individual variance is statistically significant in the four groups at 1% level.

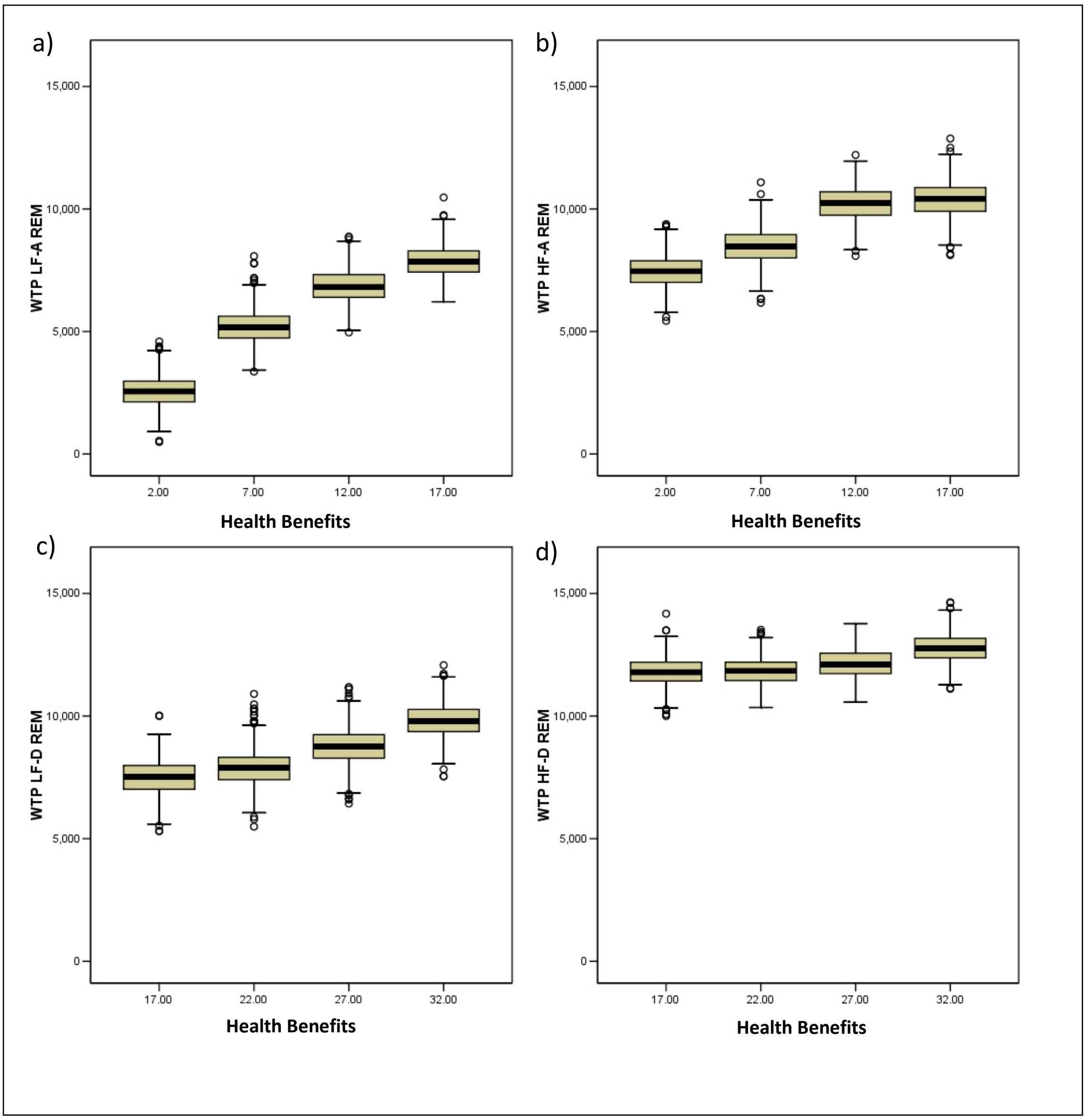
Scope Effects

Wald test in REM shows statistically significant slope in WTP curve, for HF and LF, in AS and DS (Table 1.11). Marginal utility of health benefits is higher for LF than HF groups. Poe test demonstrates that slopes are significantly higher for the LF group than the HF group. Boxplot figures below show scope sensitivity, CIs of WTP for the four health benefits do not coincide in any of the four groups considered.

Table 1.11 Slope in WTP curves, REM							
Health benefit	LF (N=750)			HF (N=729)			Poe test $H_0: Slope_{LF} = Slope_{HF}$ $H_1: Slope_{LF} > Slope_{HF}$
	Slope	95% confidence interval*	Wald test $H_0: Slope = 0$ $H_1: Slope \neq 0$	Slope	95% confidence interval*	Wald test $H_0: Slope = 0$ $H_1: Slope \neq 0$	
2-17	356.44	(307.30 406.19)	13.974 (0.000)	210.67	(161.06 257.17)	8.711 (0.000)	(0.000)
32-17	155.69	(114.24 197.93)	6.861 (0.000)	62.94	(19.49 108.52)	2.834 (0.004)	(0.001)

*obtained with 1,000 Krinsky-Robb draws (Krinsky and Robb, 1986)

Figure 1.2 Distribution of responses for health benefits, REM



Discussion and Concluding Remarks

This study obtains primary data on WTP for a health benefit and individual's emotional load regarding this health benefit, and use it to study the influence of emotions in stated preference analysis.

These results suggest an important influence of emotions on WTP for a DES. Individuals that have declared high levels of fear and anxiety related to the angioplasty, are willing to pay more for a DES than other individuals declaring low or medium levels of fear and anxiety. The difference in mean WTP between HF and LF is always statistically significant at 1% level, however, is sensitive to changes in the magnitude of health benefit and to the sequence.

Moreover, emotions explain differences in WTP curve slope. Responses of LF individuals show more sensitivity to variations in the level of health benefit. Therefore, individuals with an important emotional load in relation to the evaluation of a DES show a statistically lower marginal utility of health benefits than individuals without such an important emotional burden.

Also, the sequence seems to affect the magnitude of scope effects As such, individuals in DS, that evaluate higher health benefits, show lower sensitivity to scope effects. This might be explained by budget constraints, in line with Smith (2003), who found a relation between scope insensitivity and budget constraint. For Smith, "the higher the proportion of income the expressed WTP represents, the greater the insensitivity of that WTP to changes in the scale of the good".

Concerning the determinants of bid-acceptance, labour status is not statistically significant for the HF group in both DB model and REM. Budget constraint does not influence responses for HF individuals since being employed or not is not statistically significant to explain bid acceptance.

If emotions influence individual responses in a CV survey, this might be considered by health financing decision makers. If HF individuals' responses are not affected by their labour status, it would imply that their WTP is beyond their financial capacity, in line with findings by Noor Aizuddin *et al*. (2012) for WTP for health care.

The conventional use of WTP values, as the ones elicited in this study, is a cost-benefit analysis for privately funded health services (Shackley and Donaldson, 2000). In a scenario of a privately financed insurance company that is considering the inclusion of DESs, the cost-benefit analysis compares WTP for a DES with the total cost of the intervention. If the cost is below the WTP value, the insurance will decide to include DESs in the insurance premium and cover the costs of the intervention to implant DES and its treatment. However, there are differences in WTP for a DES between groups in the society, this study provide evidence of WTP for the same benefits of individuals declaring different levels of fear for angioplasty, that are statistically significantly different.

These results suggest that a more appropriate economic evaluation of DES should analyse individual's preferences and determinants of WTP. Benefits of DES are particularly important for individuals declaring high fear for angioplasty, however, budget constraint does not seem to be a determinant of WTP for these individuals and it might be beyond their financial capacity. Also, the sequence affects scope effects, since the marginal utility of health benefits is higher in the AS than in the DS. Failure to consider the determinants of WTP may lead to erroneous decision making in private and publicly financed health service provision.

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CHAPTER 2

THE INFLUENCE OF FEAR AND ANXIETY IN LEARNING AND SEQUENCING EFFECTS IN PREFERENCE ELICITATION

2.1 Introduction

An important aspect in the use of preference elicitation methods is the presence of anomalies (Shogren, 2003). This study examines an anomaly observed in double bounded (DB) elicitation model, which is described as an inconsistency between WTP estimates using the first response provided by respondents and the estimates using the first and second response together.

The NOAA panel report on Contingent Valuation (CV) (Arrow *et al.*, 1993) recommended the use of single bounded (SB) dichotomous-choice referendum questions, in order to obtain reliable responses. SB response format is the only format having incentive compatibility, thus, avoiding any strategic decision-making behavior from respondents (Carson *et al.*, 2003). On the other hand, the DB model (Hanemann, 1985), which includes a follow-up question based on the response to the initial question, allows for a substantial improvement in statistical efficiency, yielding more precise welfare estimates (Hanemann *et al.*, 1991) (McFadden and Leonard, 1993) (Alberini, 1995). However, there is evidence on DB internal inconsistencies measured as statistically significant difference between mean WTP obtained with the first response and mean WTP obtained with first and second responses from the same individual. This anomalous SB-DB difference has been found, for example, in Cameron and Quiggin (1994), McFadden (1994), Bateman *et al*. (2002) and Watson and Ryan (2007). A number of studies have tried to explain this anomaly.

As such, DB internal inconsistency has been explained as caused by an hypothetical bias (Blomquist *et al*., 2009; Blumenschein *et al*., 1998 and 2008; Champ and Bishop, 2001; Cummings and Taylor, 1999; Harrison and Rutström, 2008; Loomis *et al*., 1996; Murphy *et al*., 2005). Hypothetical bias has been observed in CV analysis for the evaluation of health care in Onwujekwe *et al*. (2005) and Ozdemir *et al*. (2009).

Alberini *et al*. (1997) and Carson *et al*. (1994) considered SB-DB inconsistency as a violation of respondent´s initial expectations; since the respondent assumes that the first bid represents the actual cost of the good, a higher follow-up bid can be interpreted as the surveyors trying to obtain more money. Attempts to overcome such bias lead to authors to remove the follow-up question, for those who answer yes to the first question (Cooper *et al*., 2002). On the other hand, if the follow-up bid is lower than the initial bid, the respondent`s may interpret that the quality of the good is lower than initially declared (Bateman *et al*., 1999).

Mitchell and Carson (1989) considered that respondents answer strategically and lessen their stated WTP in the second response in order to increase the difference between what they would really pay and the price of the good.

SB-DB inconsistencies are also explained by yea-saying behavior, assuming that once the respondent answers “Yes” to the first bid s/he also says “Yes” to the second bid, even if it lies above his true WTP. A possible explanation for this behavior is that respondents may consider that answering “No” to the follow-up bid could be understood as having weak preferences or as if s/he had not properly understood the questionnaire. (Cameron and Quiggin, 1994; Carsson *et al*., 1999; Frew *et al*., 2003; Holmes and Kramer, 1995; Kanninen, 1995; Mitchell and Carson, 1989; Ready *et al*., 1996 and Ryan *et al*., 2004).

Prospect Theory (Kahneman and Tversky, 1979) also applies in explaining SB-DB inconsistencies. According to it, respondents may frame the second question as a gain or loss with respect to the initial bid in the first question. This hypothesis as been tested as framing effects (DeShazo, 2002).

Additional work on this matter considers that the individual may interpret the first bid as the true value of the good functioning as an anchor. Responses to the second question are anchored to this value, losing the efficiency gain from the second question. (Bathia, 2005; Boyle *et al*., 1985 and 1997; Chien *et al*., 2005; Flachaire, 2006 and 2007; Herriges and Shogren, 1996; Ladenburg and Olsen, 2008; McNamee *et al*., 2010; Stalhammar, 1996; Veronesi, 2011 and Whitehead, 2002).

Discovered Preference Hypothesis (DPH) assumes that consistent preferences are learned or discovered through a process of repetition and experience (Plott, 1996). People might not have a-priori well-formed preferences for a good they have not experience with, and this explains inconsistencies between SB and DB estimations.

Basically, when people make decisions in an unfamiliar hypothetical market it is not always clear for them what they have to do. As long as they make similar decisions repeatedly their preferences for the good evolve. DPH assumes stable and context free preferences, meaning that preferences exist, are unique and prior to the decision task, as opposed to the constructed preference hypothesis (Slovic, 1995). This way, choice behavior complies with standard preference theory since "the final product of the [elicitation] process may be a preference-like object (…) familiar to economic theory" (pp.227). In this framework, actual preferences are the result of a process of learning, in the sense that people learn through experience in a process that requires repetition. In fact, List (2003) found that as choices are repeated and respondents gain familiarity with the decision environment, decisions become less random and more statistically efficient.

In order to mitigate SB-DB anomalies, Bateman *et al*. (2008) introduced an innovative design for CV, the Learning Design Contingent Valuation (LDCV), which assumes that individuals can form stable preferences for unfamiliar non-market goods in repetitive evaluation exercises and, thus, reduce or eliminate SB-DB differences in WTP estimations.

In their experiment, Bateman and colleagues tested the speed at which individuals form stable preferences for a good they have not previous experience with and whether those preferences were consistent with standard theory. Their aim was to test the trade-off between the absence of a learning process in SB elicitation format and its incentive compatibility in a context of non-familiar goods. Since SB format does not allow for learning, in a sequence of questions, it would be the last question the one yielding consistent WTP estimations. In Bateman *et al*., WTP questions for different animal welfare initiatives (hens, chickens, cow and pigs) were presented in that order in four consecutive DB questions. On the other hand, a second group of individuals valued the increase in animal welfare only for pigs with a DB question. Increasing familiarity with the design of the questionnaire is expected to reduce SB-DB inconsistencies. The authors found a substantial and statistically significant difference in mean WTP estimates using SB and DB models for all individuals with only a DB question. However, as the evaluation task continues these SB-DB discrepancies decline and are not statistically significant. According to these results, it seems that learning with experience and repetition reduce SB-DB inconsistencies and yield efficient estimates for individual preferences.

However, Ariely *et al*. (2003) identify a counter effect to learning through experience referred to as coherent arbitrariness. Individuals' choices are internally coherent within the questionnaire but can be influenced by the sequence in which the successive questions are ordered (Diamond and Hausmann, 1994).

This chapter tests learning and sequencing effects using a CV survey on WTP for a DES. In this chapter the term sequencing effects refer to the fact that values that respondents give to goods presented in a ranked sequence are based in the order they receive in the sequence (Carson and Mitchell, 1995). Although the survey has not been designed as an inclusive list of goods, where each good is an addition to goods previously valued in the survey, in the questionnaire the value of the good being valued increases or decreases throughout the sequence regardless of individual responses, therefore it is possible to expect sequencing effects. (Powe and Bateman, 2003; Bateman *et al*., 1996 and 2004).

Furthermore, a novel consideration is included: the influence of emotions in choice behavior. No previous attempt has been found in the literature to analyze how emotions influence learning in repeated choice scenarios in CV. Therefore, a third objective of this research is to test whether emotions such as fear or anxiety induce further SB-DB inconsistencies and affects learning and sequencing effects.

This chapter continues as follows, Section 2 presents the design of the questionnaire that provided the data. Section 3 outlines the methodology to estimate WTP values. Results and consistency tests are presented in Section 4. In the final Section results are discussed and main conclusions summarized.

2.2 Material and data

Repetition is a fundamental feature for learning and, thus, determines the questionnaire format (Carlsson, 2010). In order to test for learning and sequential effects, a repetitive evaluation exercise with four consecutive questions was designed allowing for the use of diverse sequences.

Questionnaire

The questionnaire is divided in three main sections. The first and the third section are identical for the two types of questionnaire. The second section only differ in the sequence of the evaluation task.

First section: General information

In the first section participants were informed about the objectives and nature of the study. The interviewer provided information about causes and symptoms of coronary arteries occlusion and how the most common intervention to unblock arteries is a coronary angioplasty to implant a stent. Then s/he described the risk of restenosis, which is the artery blocking again and the need for a new coronary angioplasty. A description of DES and bare metal stents (BMS) followed, with a remark on DES demonstrating lower probability of restenosis than BMS, specifying that none of them guarantee zero risk of restenosis. The description was facilitated with cards and drawings (see Annex 1)

Second section: Evaluation task

An initial question on being willing to pay for a DES was included to identify those individuals having positive WTP. The default option for those not accepting the bid is the *status quo*, being treated with a BMS at no cost. The change analysed is a health benefit which was described as the percentage-point reduction in the probability of restenosis. A negative WTP is not expected. Cost information was not provided in this point of the survey and the choice was made only considering the health benefit. Individuals choosing not to pay for a DES did not continue with the questionnaire after this point.

Those with a positive WTP proceeded with the evaluation task consisting on a choice scenario with two attributes: health benefit and bid. In the computer's screen the interviewer showed a given percentage-point reduction in the probability of restenosis and explained that this reduction would mean moving from probability A (A patients out of 100) to probability B (B patients out of 100) having restenosis if DES is implanted, where A>B. Then the card with the price (bid) is shown and the participant is asked "Would you accept to pay this price for a DES?". The respondent confronts a dichotomous choice, to accept (Y), to reject (N) or not providing an answer (N/A). A second question follows with a second price that is higher than the first one (bid_{up}) or lower (bid_{down}) if the respondent accepts or rejects the first one, respectively. The payment vehicle, if the participants accept to pay, is one payment at the moment of the decision in the hospital. In each evaluation task the values of the bid and the health benefit change. The values of the first bid are selected randomly from a set of bids. The bids were tested in a sample survey with 100 observations in order to meet that the range is wide enough to reflect the true WTP curve.

First bid was randomly selected from the series (*30*, 100, 400, 900, 1,500, 3,000, 6,000, *12,000*, 18,000, *30,000*). Then, if first response was Y, the next bid was offered; if the first response was N, the previous bid was offered, (in italics, bids that were only offered as second bids). The evaluation task is repeated four times in total with different health benefits and bids. Two sequences of health benefit were constructed and assigned randomly to participants.The values of the health benefits offered in the questionnaires range from 32 to 2 percentual point reduction in the probability of restenosis (Table 2.1). These values are taken from literature on DES efficiency. Not every patient has the same probability of restenosis, therefore the health benefit of a DES is influenced by factors such as size of the artery, long-term heart lesions or diabetes mellitus (Gun *et al.*, 2003). Patients presenting any of these factors are considered at high risk of suffering restenosis and, therefore, benefit more if they receive a DES rather than a BMS. The probability of restenosis in patients diagnosed with diabetes decreased from 35% for patients using a BMS to 7.7% for those using DES (Baumgart *et al.*, 2007; Chan *et al.*, 2005; Moses *et al.*, 2003). Highest benefit from DES is for patients with occlusive lesions in cardiac arteries, since only 3 percent of patients with occlusive arteries needed revascularization in the first year after the initial surgery (van Domburg *et al.*, 2005).

Table 2.1. Health benefit in the evaluation task (% reduction in the probability of restenosis)				
	1st valuation	2nd valuation	3rd valuation	4th valuation
Ascending Sequence	2	7	12	17
Descending Sequence	32	27	22	17

This research follow a stepwise design (Bateman *et al.,* 2004; Andersson and Svensson, 2008), that is, individuals participating in the survey do not receive prior information about the order in the value of the good they are valuing. They are not informed about the fact that two groups of individuals participating in the survey value two difference scenarios, nor that there is an explicit order in the sequence of questions they answer. They are informed about the fact that they are valuing a DES that will reduce the probability of restenosis. They also receive a specific advice on their responsibility to provide a response that is close to reality and to consider that if they answer "Yes" to a bid they should be able to pay that price in real life.

This section of the questionnaire includes the question "Does the idea of being operated causes you fear and/or anxiety?" which individuals responded using a Likert scale from 0 (no fear) to 10 (max fear).

Third section: Socio-economic information

Finally, information was collected on age, gender, schooling, occupation, family size and net disposable income and a few annotations on the attitude and the understanding of the participants.

Survey sample

The survey was conducted in February-April 2009 in Spain among population older than 19 years old. 108 municipalities representing seven different habitat sizes were selected from the 17 Spanish regions. Municipalities with less than 2,000 inhabitants to cities with more than one million residents were represented in the sample. Respondents' selection was used on the base of gender and age distribution within the household. The interviewers use a Computer Assisted Personal Interview (CAPI) methodology. Sample size was 1,663.

2.3 Methodology

Willingness to pay elicitation models

In a dichotomous choice, people are asked whether they would accept the provision of a non-market good at a given price that varies among subsamples. The allowable answer is therefore closed and dichotomous: 'Yes' or 'No', although a fraction of the population does not know or does not answer. From the 'Yes' or 'No' responses to the different bid amounts, a probability function is estimated, out of which the mean or median of the individual maximum WTP is computed as a welfare measure.

In this chapter, the referendum question implies that the individual is comparing two different scenarios: the status quo with a certain level of health benefit, q_0, against a higher health benefit q_1 at a given price (bid_1). We consider the bid that would make the individual *i* indifferent between both options, that is, the individual maximum WTP. This maximum WTP for the improvement from q_0 to q_1 may be written as:

$$WTP_i = f\left(q_{i0}, q_{i1}, \varepsilon_i\right), \qquad (1)$$

where ε_i is an stochastic component representing the other components that are unobservable to the researcher.

Let's assume that the individual's WTP is given by the expression:

$$WTP_i = \mu + \varepsilon_i\,, \qquad (2)$$

where the error term ε_i follows a logistic distribution with a mean of 0 and a variance of $\tau^2 \frac{\pi^2}{3}$, being τ the scale parameter.

Using this variable, the probability of a ´Yes´ answer may be expressed as:

$$\begin{aligned}
\Pr(Yes) &= \Pr\left(WTP_i \geq bid_1\right) \\
\Pr(Yes) &= \Pr\left(\mu + \varepsilon_i \geq bid_1\right) \\
\Pr(Yes) &= \Pr\left(\varepsilon_i \geq bid_1 - \mu\right) \\
\Pr(Yes) &= G\left(\frac{\mu - bid_1}{\tau}\right),
\end{aligned} \qquad (3)$$

where $G(\cdot)$ is the standard logistic cumulative distribution function. This is the logit model. Using the functional form of this cumulative distribution function, the probability can also be written as,

$$\Pr\left(Yes\right) = \frac{1}{1 + \exp\left(\frac{bid_1 - \mu}{\tau}\right)}. \tag{4}$$

The log-likelihood function for a sample of n independent binary responses can be written as:

$$LogL = \sum_{i=1}^{n} I^{y} \ln G\left(\frac{\mu - bid_1}{\tau}\right) + (1 - I^{y}) \ln\left(1 - G\left(\frac{\mu - bid_1}{\tau}\right)\right), \tag{5}$$

where I^{y} is an indicator function that take a value of one if the answer is "Yes".

In the DB model a follow-up question is included. The same question is asked again, q_2 but with a different bid. The amount of this second bid will be higher (bid_up) if the individual has accepted the initial bid, and is lower (bid_down) if s/he has rejected to pay the initial bid. Thus there are four possible cases: individual answers (1) yes to both questions, (2) no to both questions, (3) yes to the first question and no to the second one, and (4) no to the first questions and yes to the second one.

Assuming that individual's WTP is the same in both questions, the probabilities for the four possible joint answers for the first and second questions can be obtained by applying the DB model (Hanemann *et al*. 1991).

(i.) q_1=Y, q_2=Y

$$\Pr(YY) = \Pr(WTP_i > bid_1, WTP_i \geq bid_2)$$
$$= \Pr(WTP_i \geq bid_2)$$
$$= \Pr(\mu + \varepsilon_i \geq bid_2) \tag{6}$$
$$= \Pr(\varepsilon_i \geq bid_2 - \mu)$$
$$= 1 - G\left(\frac{bid_2 - \mu}{\tau}\right)$$

(ii.) q_1=N, q_2=N

$$\Pr(NN) = \Pr(WTP_i < bid_1, WTP_i < bid_2)$$
$$= \Pr(WTP_i < bid_2)$$
$$= \Pr(\mu + \varepsilon_i < bid_2) \tag{7}$$
$$= \Pr(\varepsilon_i < bid_2 - \mu)$$
$$= G\left(\frac{bid_2 - \mu}{\tau}\right)$$

(iii.) q_1=Y, q_2=N

$$\Pr(YN) = \Pr(WTP_i \geq bid_1, WTP_i < bid_2)$$
$$= \Pr(bid_1 \leq WTP < bid_2)$$
$$= \Pr(bid_1 \leq \mu + \varepsilon_i < bid_2) \tag{8}$$
$$= \Pr\left(\frac{bid_1 - \mu}{\tau} \leq \frac{\varepsilon_i}{\tau} < \frac{bid_2 - \mu}{\tau}\right)$$
$$= G\left(\frac{bid_2 - \mu}{\tau}\right) - G\left(\frac{bid_1 - \mu}{\tau}\right).$$

(iv.) q_1=N, q_2=Y

$$
\begin{aligned}
\Pr\left(NY\right) &= \Pr\left(WTP < bid_1, WTP \geq bid_2\right) \\
&= \Pr\left(bid_2 \leq WTP < bid_1\right) \\
&= \Pr\left(bid_2 \leq \mu + \varepsilon_i < bid_1\right) \\
&= \Pr\left(\frac{bid_2 - \mu}{\tau} \leq \frac{\varepsilon_i}{\tau} < \frac{bid_1 - \mu}{\tau}\right) \\
&= G\left(\frac{bid_1 - \mu}{\tau}\right) - G\left(\frac{bid_2 - \mu}{\tau}\right).
\end{aligned} \tag{9}
$$

Estimates for $\gamma = -\frac{1}{\tau}$ and $\alpha = \frac{\mu}{\tau}$ for each health benefit are obtained by applying maximum-likelihood estimation. The log-likelihood function for this model is:

$$
\begin{aligned}
\sum_{i=1}^{N} \Bigg[& I_i^{YY} \ln\left(1 - G\left(\frac{bid_2 - \mu}{\tau}\right)\right) + \\
& I_i^{NN} \ln\left(G\left(\frac{bid_2 - \mu}{\tau}\right)\right) + \\
& I_i^{YN} \ln\left(G\left(\frac{bid_2 - \mu}{\tau}\right) - G\left(\frac{bid_1 - \mu}{\tau}\right)\right) + \\
& I_i^{NY} \ln\left(G\left(\frac{bid_1 - \mu}{\tau}\right) - G\left(\frac{bid_2 - \mu}{\tau}\right)\right)\Bigg],
\end{aligned} \tag{10}
$$

where I^{YY}, I^{NN}, I^{YN}, I^{NY} are indicator functions that equals one or zero depending on the two responses for each individual.

From these parameters, the individual`s mean WTP is given by,

$$E\left(WTP_i\right) = \mu = -\frac{\alpha}{\gamma}. \qquad (11)$$

Tests for learning and sequential effects

Learning is tested examining consistency in SB and DB responses in successive evaluations of health benefits. From now on, mean WTP for SB responses is denoted as μ_{SB_j}, and mean WTP for DB responses as μ_{DB_j}, where j stands for the level of health benefit being valued. In order to analyze DB inconsistencies, the author evaluates the difference in $(\mu_{SB_j} - \mu_{DB_j})$ denoted as Δ_j, to test the null hypothesis of equal means:

H_0: $(\mu_{SB_j} - \mu_{DB_j}) = 0$.

Testing H_0 requires control for the non-independence of the first and second responses for each respondent. When testing the significance of differences between SB and DB model the responses cannot be considered independent since both estimates are computed using the same initial responses from the same individuals. In order to test the significance of the difference of estimates of SB and DB WTP this chapter follows Bateman *et al*. (2008). In this paper a jackknife variance estimator is used to estimate the variance of the difference $(\mu_{SB_j} - \mu_{DB_j})$. Estimates of Δ_j are obtained by jackknife sampling methods.

For each jackknife sample *k* an estimate θ_k of Δ_j is computed as the difference in mean WTP estimates obtained from the SB and DB models. Following this approach *n* estimates of Δ_j are obtained, $\{\theta_1, \theta_2, \ldots, \theta_n\}$, where *n* is the total sample size.

From these estimates the variance is computed as:

$$\mathrm{Var}\ \Delta_j = [(n-1)/n] \sum_{k=1}^{n} \left(\theta_k - \Delta_j\right)^2. \qquad (12)$$

Therefore, $H_0 : (\mu_{SB_j} - \mu_{DB_j}) = 0$ can be tested using the following t-statistic:

$$t = \Delta_{j/} \left[\mathrm{Var}\left(\Delta_j\right)\right]^{1/2}. \qquad (13)$$

To test for sequencing effects, differences in WTP for the same health benefit between AS and DS are measured. WTP estimates for 17 percentual point reduction in the probability of restenosis are denominated $\mu_{SB_{17}}^{AS}$and $\mu_{SB_{17}}^{DS}$ for individuals in the AS and DS respectively, in the SB model; and $\mu_{DB_{17}}^{AS}$and $\mu_{DB_{17}}^{DS}$ for individuals in the AS and DS respectively, in the DB model. The differences $\left(\mu_{SB_{17}}^{AS} - \mu_{SB_{17}}^{DS}\right)$ and $\left(\mu_{DB_{17}}^{AS} - \mu_{DB_{17}}^{DS}\right)$ are analyzed testing the null hypothesis of differences in WTP for the same health benefit being 0.

H_0: $\left(\mu_{SB_{17}}^{AS} - \mu_{SB_{17}}^{DS}\right) = 0$.

H_0: $\left(\mu_{DB_{17}}^{AS} - \mu_{DB_{17}}^{DS}\right) = 0$.

In these two cases testing H_0 does not require controlling for non-independence of responses since observations are drawn from two independent samples. A test of hypothesis of equal means from independent samples (Poe, 1997) is used, using 5,000 replications following the Krinsky Robb procedure (Krinsky and Robb, 1986).

2.4 Results

Individuals that were not willing to pay for a DES (N=149) ended the questionnaire at this point. Responses of individuals who answered "N/A" to a bid were not considered (N=16). Final sample size was 1,498, distributed in the AS (N=724) and the DS (774). Individuals were also distributed according to their stated level of fear and anxiety related to angioplasty. As such, 761 individuals declaring levels of fear lower than 8 in the Likert scale were allocated to the Low Fear group (LF). And 737 individuals who declared 8 and more in the Likert scale were assigned to the High Fear group (HF).

Results for the Complete Sample

Table 2.2 presents estimates of coefficients α and γ and standard errors , t-statistics and the Log Likelihood for the SB and DB models for the four health benefits presented to participants, in the two sequences.

Table 2.2 Estimates for SB and DB models. Complete sample (N=1,498)									
AS (N=724)									
SB						DB			
Health Benefit	Coeff	Estimates	St.Error	t-statistics	LogL	Estimates	St.Error	t-statistics	LogL
2	α	.68456***	.10101	6.777	462.37	.73838***	.09296	7.942	878.19
	γ	-.00013***	.00001	-8.203		-.00017***	.00000	-18.854	
7	α	1.0000***	.10488	9.534	438.88	1.0703***	.09971	10.734	889.83
	γ	-.00014***	.00001	-8.742		-.00019***	.00000	-20.845	
12	α	1.2772***	.11002	11.609	418.77	1.3309***	.10806	12.317	913.95
	γ	-.00013***	.00001	-8.514		-.00019***	.00000	-20.139	
17	α	1.3900***	.11457	12.132	407.15	1.4037***	.10731	13.081	875.73
	γ	-.00013***	.00001	-8.685		-.00018***	.00000	-19.984	
DS (N=774)									
SB						DB			
32	α	1.4242***	.11226	12.687	431.58	1.4102***	.10492	13.440	918.27
	γ	-.00010***	.00001	-7.313		-.00013***	.00000	-18.013	
27	α	1.2923***	.10933	11.820	449.65	1.3122***	.10184	12.884	949.17
	γ	-.00010***	.00001	-7.349		-.00014***	.00000	-19.106	
22	α	1.2048***	.10839	11.116	459.86	1.2289***	.09786	12.558	888.42
	γ	-.00011***	.00001	-8.385		-.00014***	.00000	-18.051	
17	α	1.0687***	.10316	10.359	474.30	1.1976***	.09879	12.122	939.65
	γ	-.00009***	.00001	-7.091		-.00014***	.00000	-17.939	

***significant at 1% level

The coefficients show, as expected, a negative relation of the bid with the probability of accepting it; the higher the bid, the lower the probability to accept it. All coefficients result statistically significant at 1% level (p=0.000) in the SB model and in the DB model (p=0.000), in AS and DS.

Table 2.3 includes estimates of μ_{SB_j}, μ_{DB_j} as well as SD and 95% CI for these estimates using Krinsky-Robb procedure. T-statistics for the hypothesis of $(\mu_{SB_j} - \mu_{DB_j})$ being 0 are included in the table, as well as their p-values.

Table 2.3 Differences in WTP for SB and DB models, $(\mu_{SB_j} - \mu_{DB_j})$. Complete sample (N=1,498)

Health Benefit	Model	WTP (SD)†	95% CI†		$(\mu_{SB_i} - \mu_{DB_i})$	t-statistics††	p-value
AS (N=724)							
2	SB	4,966.44 (588.39)	(3,335.39	6,973.57)	630.83	2.187	0.029
	DB	4,335.61 (449.11)	(3,228.81	5,531.05)			
7	SB	6,933.92 (656.30)	(5,245.33	8,966.44)	1,455.59	3.471	0.000
	DB	5,478.33 (395.23)	(4,426.61	6,640.07)			
12	SB	9,667.29 (872.07)	(7,576.48	12,384.10)	2,780.18	4.186	0.000
	DB	6,887.11 (399.00)	(5,759.99	8,128.28)			
17	SB	10,506.32 (903.92)	(8,266.71	13,204.29)	2,945.25	3.892	0.000
	DB	7,561.07 (414.37)	(6,343.96	8,829.04)			
DS (N=774)							
32	SB	14,238.42 (1,453.53)	(11,024.70	18,547.19)	3,984.16	3.619	0.000
	DB	10,254.26 (542.49)	(8,635.18	11,985.91)			
27	SB	12,849.38 (1,296.95)	(9,864.01	16,815.93)	3,881.27	3.778	0.000
	DB	8,968.11 (500.87)	(7,464.45	10,530.09)			
22	SB	10,443.91 (920.60)	(8,162.72	13,385.87)	1,681.07	2.426	0.015
	DB	8,762.84 (523.56)	(7,305.29	10,337.71)			
17	SB	11,077.71 (1,184.35)	(8,373.52	14,838.21)	2,786.36	3.140	0.001
	DB	8,291.35 (503.45)	(6,796.38	9,817.26)			

†SD and CI estimated using Krinsky-Robb procedure with 5,000 draws

††t-statistic estimated following Bateman *et al*. (2008)

SB and DB estimations of WTP for the initial health benefit (2%) result statistically significantly different at 5% level in the AS (p=0.029). In DS, WTP estimations of the initial question (32%) for SB and DB models are statistically significantly different at 5% level (p-value=0.000).

When individuals in the AS are confronted with consecutive levels of health benefits, disparity in SB and DB estimations increases and is statistically significant at 5% level. In DS it is not possible to describe a trend. The difference between SB and DB estimations decreases and in the final question rises up to 2,786.36 €. These differences are statistically significant throughout the evaluation task at 5%.

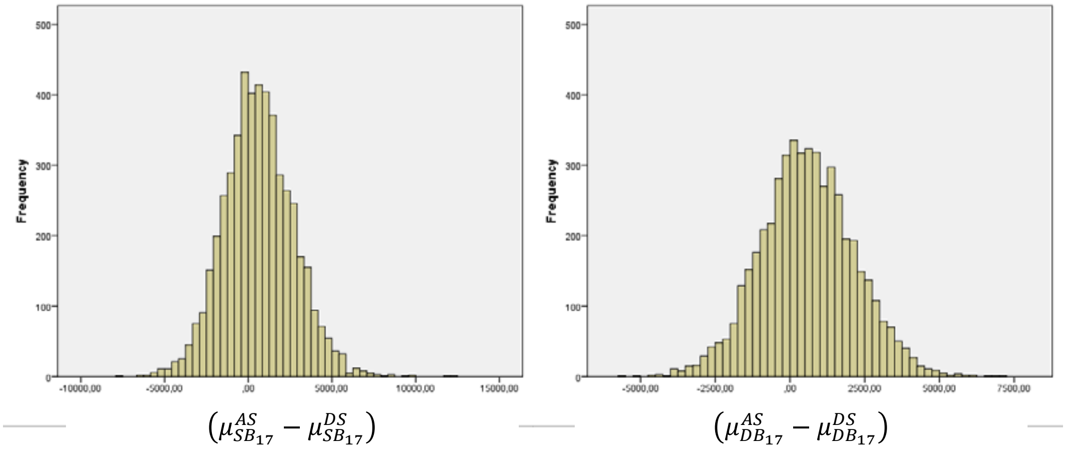
Learning as described by Bateman *et al*. (2008) is not observed in these results, since the initial statistically significantly difference between SB and DB estimations is not gradually reduced with experience and repetition.

Table 2.4 presents the results of the test for differences in mean WTP between AS and DS for a reduction of 17 percentual points in the probability of restenosis, and Figure 2.1 shows the distribution of 5,000 Krinsky-Robb replications of the differences in SB estimations for the AS and DS, as well as differences in DB estimations for the two sequences. Responses are not statistically significantly different between groups, in both SB and DB models. Even though the two sequences show differing response behavior and internal inconsistencies in the SB and DB model, in the evaluation of the same health benefit both sequences provide WTP estimates that are not statistically different.

Table 2.4 Differences in final WTP estimates (17%) $\left(\mu_{SB_{17}}^{AS} - \mu_{SB_{17}}^{DS}\right)$ and $\left(\mu_{DB_{17}}^{AS} - \mu_{DB_{17}}^{DS}\right)$. Complete sample†					
Model	WTP_AS (SD)	WTP-DS (SD)	$(\mu_{AS_{17}}$- $\mu_{DS_{17}})$ (SD)	$(\mu_{AS_{17}}$- $\mu_{DS_{17}})$ 95% CI	p-value
SB	10,506.32 (903.92)	11,077.71 (1,184.35)	549.29 (2,099.06)	(-766.52 1,959.60)	0.389
DB	7,561.07 (414.37)	8,291.35 (503.45)	727.77 (991.55)	(63.80 1,376.52)	0.227

†SD and CI estimated using Krinsky-Robb procedure with 5,000 draws

Figure 2.1 $\left(\mu_{SB_{17}}^{AS} - \mu_{SB_{17}}^{DS}\right)$ and $\left(\mu_{DB_{17}}^{AS} - \mu_{DB_{17}}^{DS}\right)$ distribution, complete sample



Results for LF individuals

LF individuals are distributed in AS (356) and DS (405). Table 2.5 includes estimated coefficients for α and γ and standard errors , t-statistics and the Log Likelihood for the SB and DB models. As expected, the coefficients show a negative sign for the bid. All coefficients result statistically significant at 1% level in the SB model and in the DB model.

Table 2.5 Estimates for SB and DB models. LF (N=761)									
				AS (N=356)					
		SB				DB			
Health Benefit	Coeff	Estimates	St.Error	t-statistics	LogL	Estimates	St.Error	t-statistics	LogL
2	α	.39335***	.14280	2.755	219.98	.46328***	.12807	3.617	414.84
	γ	-.00020***	.00003	-6.850		-.00021***	.00001	-13.684	
7	α	.69068***	.14142	4.884	227.37	.84656***	.13756	6.154	459.38
	γ	-.00013***	.00002	-5.489		-.00021***	.00001	-14.495	
12	α	1.0000***	.14834	6.741	218.44	1.1290***	.14663	7.700	472.87
	γ	-.00013***	.00002	-5.729		-.00021***	.00001	-14.475	
17	α	1.1622***	.15464	7.515	211.91	1.2304***	.14613	8.420	440.06
	γ	-.00013***	.00002	-5.880		-.00019***	.00001	-14.113	
				DS (N=405)					
32	α	1.2148***	.14602	8.320	239.30	1.1770***	.13711	8.584	514.67
	γ	-.00011***	.00002	-5.740		-.00014***	.00001	-13.406	
27	α	1.1225***	.14596	7.691	244.94	1.1165***	.13276	8.410	505.64
	γ	-.00012***	.00002	-6.175		-.00015***	.00001	-14.598	
22	α	1.0000***	.14399	6.945	248.33	1.0397***	.12912	8.052	483.31
	γ	-.00013***	.00002	-6.452		-.00015***	.00001	-13.693	
17	α	.83521***	.13703	6.095	257.19	.98883***	.12948	7.637	491.11
	γ	-.00012***	.00002	-5.810		-.00016***	.00001	-13.352	

***significant at 1% level

Estimations for μ_{SB_j}, μ_{DB_j} as well as SD and 95% CI for these estimates using Krinsky-Robb procedure are included in Table 2.6. The table also includes t-statistics for the hypothesis of $(\mu_{SB_j} - \mu_{DB_j})$ being 0 and the p-values.

Table 2.6 Differences in WTP SB and DB models, $(\mu_{SB_j} - \mu_{DB_j})$. LF (N=761)						
AS (N=356)						
Health Benefit	Model	WTP (SD)†	95% CI†	$(\mu_{SB_i} - \mu_{DB_i})$	t-statistic††	p-value
2	SB	1,945.88 (583.53)	(586.63 3,484.35)	-204,47	0.739	0.460
	DB	2,150.35 (527.43)	(966.76 3,355.02)			
7	SB	5,046.22 (867.70)	(2,815.55 8,159.46)	1,054.10	2.052	0.040
	DB	3,992.12 (522.693)	(2,692.60 5,432.75)			
12	SB	7,372.04 (1,037.69)	(4,861.21 10,879.88)	2,086.68	2.705	0.007
	DB	5,285.36 (512.09)	(3,924.81 6,754.80)			
17	SB	8,844.51 (1,159.20)	(6,009.58 12,966.56)	2,532.43	2.606	0.009
	DB	6,312.08 (557.33)	(4,761.98 7,972.58)			
DS (N=405)						
32	SB	10,656.76 (1,408.88)	(7,459.88 15,656.27)	2,182.71	2.315	0.021
	DB	8,474.05 (726.74)	(6,422.79 10,793.72)			
27	SB	8,918.72 (1,096.51)	(6,201.23 12,633.80)	1,857.49	2.217	0.027
	DB	7,061.23 (636.66)	(5,310.89 8,887.92)			
22	SB	7,433.43 (918.22)	(5,086.13 10,682.56)	826.95	1.361	0.189
	DB	6,606.48 (635.05)	(4,861.40 8,448.65)			
17	SB	6,974.01 (998.95)	(4,477.47 10,410.09)	968.25	1.469	0.142
	DB	6,005.76 (606.76)	(4,400.65 7,843.88)			

†SD and CI estimated using Krinsky-Robb procedure with 5,000 draws

††t-statistic estimated following Bateman *et al*. (2008)

In the first valuation task in AS (2%) LF individuals produce WTP estimations that are internally coherent, since SB and DB estimates are not statistically significantly different. However, disparity between SB and DB estimates arises with repetition; $(\mu_{SB_7} - \mu_{DB_7})$ and $(\mu_{SB_{12}} - \mu_{DB_{12}})$ are statistically significant at 5% level.

In the DS, the initial valuations of 32% and 27% respectively, show internally incoherent estimations for SB and DB that are statistically significantly different at a 5% level. The difference decreases with repetition and are not statistically significant in the third and fourth evaluation tasks.

It is relevant to note that $(\mu^{AS}_{SB_{17}} - \mu^{AS}_{DB_{17}})$ is statistically significant at 1% level and $(\mu^{DS}_{SB_{17}} - \mu^{DS}_{DB_{17}})$ is not significant. There is an important contrast in the absolute value of these differences, 2532.43€ for the group in the AS and 968.25€ for the group in the DS, taking into account these two groups are evaluating exactly the same health benefit.

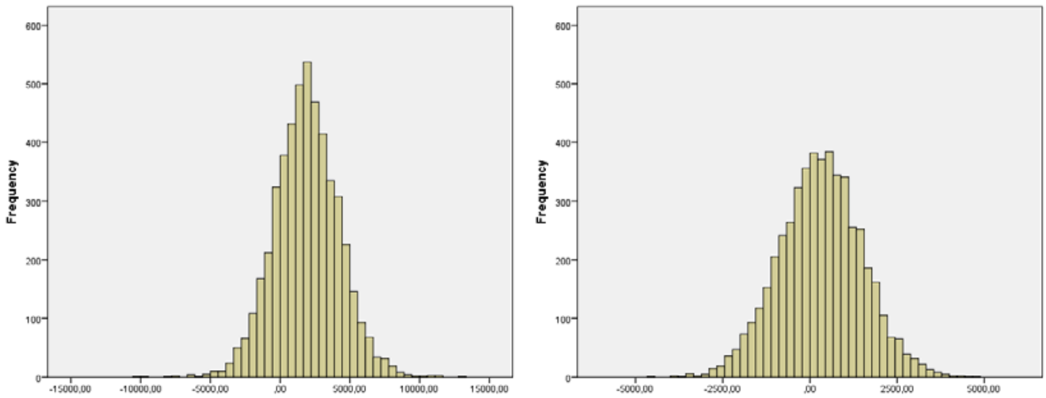
However, when responses are analyzed separately, these two groups coincide in the evaluation of the final health benefit (17%), as shown in Table 2.7. There are not statistically significant differences between $\left(\mu^{AS}_{SB_{17}}\right)$ and $\left(\mu^{DS}_{SB_{17}}\right)$. Similarly, WTP estimates with DB responses for AS and DS, $\left(\mu^{AS}_{DB_{17}}\right)$ and $\left(\mu^{DS}_{DB_{17}}\right)$ are also non-statistically significantly different.

In summary, WTP estimations for a health benefit of 17 percentual points are internally incoherent in DS and not in AS; however, when WTP estimates with the first response are compared between the two sequences, they are not significantly different. This also applies to DB estimations. Figure 2.2 shows the distribution of 5,000 replications of the difference between AS and DS in WTP for the same health benefit (17%) for the SB and DB models.

Table 2.7 Differences in final WTP estimates (17%)$\left(\mu^{AS}_{SB_{17}} - \mu^{DS}_{SB_{17}}\right)$ and $\left(\mu^{AS}_{DB_{17}} - \mu^{DS}_{DB_{17}}\right)$. LF†					
Model	WTP_AS (SD)	WTP_DS (SD)	$(\mu_{AS_{17}} - \mu_{DS_{17}})$ (SD)	$(\mu_{AS_{17}} - \mu_{DS_{17}})$ 95% CI	p-value
SB	8,844.51 (1,159.20)	6,974.01 (998.95)	1,843.00 (2,336.68)	(381.60 3,395.86)	0.200
DB	6,312.08 (557.33)	6,005.76 (606.76)	293.84 (1,172.46)	(-513.11 1,082.52)	0.405

†SD and CI estimated using Krinsky-Robb procedure with 5,000 draws

Figure 2.2 $\left(\mu^{AS}_{SB_{17}} - \mu^{DS}_{SB_{17}}\right)$ and $\left(\mu^{AS}_{DB_{17}} - \mu^{DS}_{DB_{17}}\right)$ distribution, LF



$\left(\mu^{AS}_{SB_{17}} - \mu^{DS}_{SB_{17}}\right)$ $\left(\mu^{AS}_{DB_{17}} - \mu^{DS}_{DB_{17}}\right)$

Results for HF individuals

HF individuals are distributed in AS (368) and DS (369). Table 2.8 presents α and γ coefficients and standard errors , t-statistics and the Log Likelihood for the SB and DB models. Bid coefficients are negatively related with bid-acceptance and all coefficients result statistically significant at 1% level in the SB and the DB model.

Table 2.8 Estimates of SB and DB models. HF (N=739)									
AS (N=368)									
		SB				DB			
Health Benefit	Coeff	Estimates	St.Error	t-statistics	LogL	Estimates	St.Error	t-statistics	LogL
2	α	1.1064***	.15091	7.331	223.12	1.0721***	.14040	7.636	446.48
	γ	-.00012***	.00002	-5.766		-.00015***	.00001	-13.232	
7	α	1.4324***	.16234	8.824	203.58	1.3159***	.14843	8.865	423.11
	γ	-.00016***	.00002	-7.381		-.00018***	.00001	-14.983	
12	α	1.6064***	.16884	9.514	194.00	1.5610***	.16361	9.541	433.28
	γ	-.00013***	.00002	-6.421		-.00018***	.00001	-13.778	
17	α	1.6522***	.17324	9.537	191.63	1.5934***	.15980	9.972	431.65
	γ	-.00013***	.00002	-6.517		-.00018***	.00001	-14.115	
DS (N=369)									
32	α	1.7329***	.18011	9.621	185.58	1.7129***	.16598	10.320	397.57
	γ	-.00009***	.00002	-4.851		-.00014***	.00001	-12.219	
27	α	1.5588***	.16955	9.194	196.64	1.5714***	.16101	9.759	436.26
	γ	-.00008***	.00002	-4.540		-.00014***	.00001	-12.430	
22	α	1.4670***	.16945	8.657	204.49	1.4889***	.15274	9.748	396.28
	γ	-.00010***	.00002	-5.466		-.00013***	.00001	-11.801	
17	α	1.4234***	.16247	8.761	206.14	1.4859***	.15678	9.478	437.97
	γ	-.00009***	.00001	-4.697		-.00013***	.00001	-11.929	

***significant at 1% level

Estimates for μ_{SB_j}, μ_{DB_j}, as well as SD and 95% CI for these estimates using Krinsky-Robb procedure, are included in Table 2.9. This table also includes t-statistics for the hypothesis of $(\mu_{SB_j} - \mu_{DB_j})$ being 0 and their p-values.

Table 2.9 Differences in WTP SB and DB models, $(\mu_{SB_j} - \mu_{DB_j})$. HF (N=739)						
AS (N=368)						
Health Benefit	Model	WTP (SD)†	95% CI†	$(\mu_{SB_i}-\mu_{DB_i})$	t-statistic††	p-value
2	SB	8,831.25 (1,176.41)	(5,880.49 12,833.71)	1,990.78	2.595	0.009
	DB	6,840.47 (676.43)	(5,004.63 8,826.39)			
7	SB	8,639.30 (897.39)	(6,385.49 11,594.83)	1,628.36	2.406	0.016
	DB	7,010.94 (584.97)	(5,361.65 8,807.69)			
12	SB	11,803.81 (1,360.67)	(8,661.16 16,190.47)	3,161.23	3.052	0.002
	DB	8,642.58 (610.09)	(6,772.98 10,724.70)			
17	SB	11,997.93 (1,337.06)	(8,895.45 16,292.60)	3,189.09	2.867	0.004
	DB	8,808.84 (606.33)	(6,907.94 10,836.42)			
DS (N=369)						
32	SB	18,077.21 (2,759.67)	(12,848.63 26,473.77)	5,905.73	2.637	0.008
	DB	12,171.48 (802.91)	(9,600.78 15,034.16)			
27	SB	17,786.09 (2,959.67)	(12,464.17 27,256.33)	6,577.05	2.676	0.007
	DB	11,209.04 (775.75)	(8,774.39 13,826.45)			
22	SB	13,904.85 (1,819.12)	(9,923.78 19,836.51)	2,464.12	1.782	0.075
	DB	11,440.73 (854.39)	(8,862.60 14,293.78)			
17	SB	15,950.24 (2,557.09)	(11,001.43 24,231.46)	4,949.48	2.410	0.016
	DB	11,000.76 (801.07)	(8,526.19 13,725.09)			

†SD and CI estimated using Krinsky-Robb procedure with 5,000 draws

††t-statistic estimated following Bateman *et al*. (2008)

The difference between SB and DB are statistically significant at 5% level in the first evaluation task in both AS and DS for the evaluation of 2% and 32% respectively.

The SB-DB discrepancy remains for the following evaluation tasks, and is only remarkable that for a health benefit of a 22% reduction in the probability of restenosis the difference is statistically significant at 10% level.

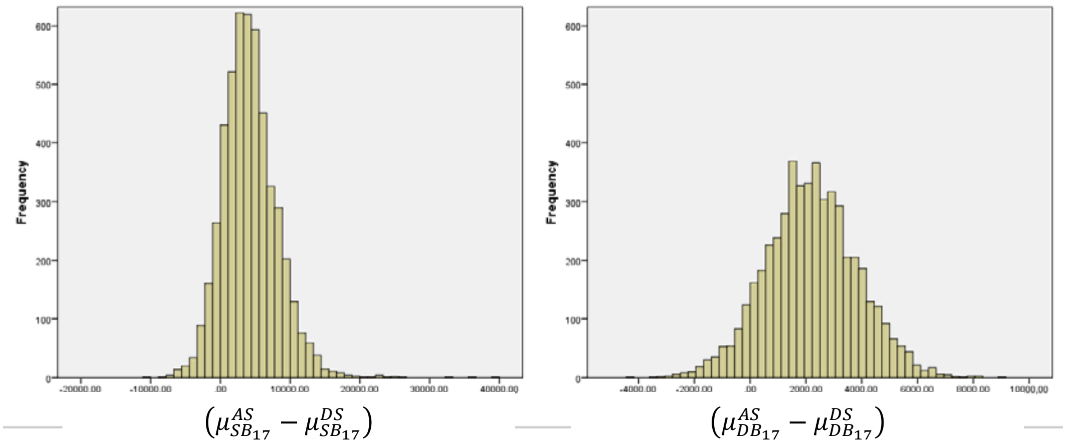
Individuals in AS and DS coincide in their WTP for the final health benefit (17%), estimated with their first response; the mean difference between the SB estimations of AS and DS is not statistically significant. In the analysis of DB responses, the mean difference between the AS and DS is statistically significant at 10% level but not at 5%, as shown in Table 2.10. Figure 2.3 displays $\left(\mu_{SB_{17}}^{AS} - \mu_{SB_{17}}^{DS}\right)$ and $\left(\mu_{DB_{17}}^{AS} - \mu_{DB_{17}}^{DS}\right)$ distribution.

Table 2.10 Differences in final WTP estimates (17%) $\left(\mu_{SB_{17}}^{AS} - \mu_{SB_{17}}^{DS}\right)$ and $\left(\mu_{DB_{17}}^{AS} - \mu_{DB_{17}}^{DS}\right)$. HF†

Model	WTP_AS (SD)	WTP_DS (SD)	$(\mu_{AS_{17}}$ - $\mu_{DS_{17}})$ (SD)	$(\mu_{AS_{17}}$ - $\mu_{DS_{17}})$ 95% CI		p-value
SB	11,997.93 (1,337.06)	15,950.24 (2,557.09)	4,003.14 (3,815.22)	(1,622.80	6,446.11)	0.122
DB	8,808.84 (606.33)	11,000.76 (801.07)	2,178.62 (1,651.10)	(1,125.41	3,251.88)	0.085

†SD and CI estimated using Krinsky-Robb procedure with 5,000 draws

Figure 2.3 $\left(\mu_{SB_{17}}^{AS} - \mu_{SB_{17}}^{DS}\right)$ and $\left(\mu_{DB_{17}}^{AS} - \mu_{DB_{17}}^{DS}\right)$ distribution, HF group



Discussion and Concluding Remarks

This study analyzes the effect of learning on the reduction of inconsistencies between SB and DB estimates in a CV survey, using data on WTP for four levels of health benefit, in two opposite sequences. Learning is tested as an examination of value coherence within the DB dichotomous choice format.

There is no evidence of learning in repeated responses to the CV questionnaire. Only in one of the considered cases is possible to observe a sort of a learning process; this phenomena is only observed for the LF group evaluating the DS. In this case, the initial evaluation shows internal inconsistencies that become non-statistically significant for the last evaluation tasks. For the other groups, in spite of the fact that in the first evaluation task there are statistically significant differences between SB and DB estimates, these differences remain statistically significant in the following evaluation tasks.

These results are not compatible with the description of *a-priori* well-formed preferences, if these are understood as preferences that would not produce, in a first question, SB and DB estimates that result statistically significantly different. In spite of the fact that the two groups of individuals in AS and DS evaluate, in the initial question, health benefits that are importantly different (2% *vs.* 32%), we observe the same pattern of behavior in terms of consistency between SB and DB responses. Therefore the existence of internal inconsistencies is not related to the magnitude of the good being valued, in this exercise. Only for LF individuals in AS, SB and DB differences in the initial evaluation of 2% are not statistically significant, however, in the next valuation of 7% SB and DB differences arise and are statistically significant.

As the questionnaire allows for the evaluation of the same final health benefit (17%), it is possible to analyze the presence of sequencing effects. Results suggest a lack of sequencing effects in individuals' responses. As such, $\left(\mu_{SB_{17}}^{AS} - \mu_{SB_{17}}^{DS}\right)$ is not statistically significant in all groups, and $\left(\mu_{DB_{17}}^{AS} - \mu_{DB_{17}}^{DS}\right)$ is not statistically significant in the complete groups and LF groups, and for the HF group is statistically significant at 10% but not at 5% level.

This lack of sequencing effects cannot be attributed to a process of learning, since individuals show internally incoherent WTP responses for different health benefits that are persistent throughout the repetitive exercise with four consecutive double-questions, in two opposing sequences. SB-DB internal inconsistencies appear in the initial question of the exercise and persist in the final evaluation of the sequence where the two groups coincide in the evaluation of the same benefit (17%). When estimates of these responses for the final double question are tested independently, that is, SB^{AS} *vs.* SB^{DB} and DB^{AS} *vs.* DB^{DS}, these estimates are not statistically significant different. Individuals in the two sequences are willing to pay a statistically similar amount for the same benefit value, in the SB and DB models.

Finally, the emotional load of heart surgery do not impact the lack of learning, although differences in WTP for a health benefit between SB and DB models are higher in HF groups.

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CHAPTER 3

WILLINGNESS TO PAY FOR AVOIDING ANGIOPLASTY TO IMPLANT A DRUG-ELUTING STENT

3.1 Introduction

Previous chapters have reviewed preference elicitation methods used in Health Economics to obtain monetary values for utility associated to a health state. As such, estimates of willingness to pay (WTP) for different values of benefit produced by a drug-eluting stent (DES) have been estimated in Chapters 1 and 2. This chapter analyses individual utility over temporary health states (THS). These are defined as transient health states, lasting less than a year, followed by total recovery. Infections, short-term medications, vaccinations, screening tests and diagnostic procedures, side effects of treatments and convalescence are defined as THS in the literature reviewed (Wright *et al*., 2009; Locadia *et al*., 2004, Grunberg *et al*., 2009).

In Health Economics, utility associated to a health state is measured in quality-adjusted life-years (QALYs). This method provides a utility weight for living in an impaired health state, H^I, worse than full health, H^F, during a period of time followed by total recovery. Therefore time in full-health that is lost during an episode, Q, is obtained as $(H^F\text{-}H^I)=Q$, where $1<Q<0$. Avoiding H^I produces a gain in QALYs equal to Q.

Two traditional methods to determine utility values for QALYs are Time Trade-Off (TTO) (Dolan *et al*, 1996) and Standard Gamble (SG) (Gafni, 1994). These methods have not proved efficient in the evaluation of acute conditions (Wright *et al*., 2009; Bala and Zarkin, 2000), mostly because the length of the health state determines the value. These techniques consider both the personal value of the health state and also the personal value of the length of life, as the individual trades time in H^I with time in perfect health H^F. Utility for H^I can be explained by utility over the specific health state or by individual´s utility over length of life. Therefore, the utility of avoiding THS is determined by the utility of avoiding a short period of time in H^I trading time in perfect health. Presumably, the individual will not be willing to give up a long period in perfect health to improve quality of life. S/He may consider that is not worth it trading time in perfect health to avoid a mild health state that lasts a few days. This is especially relevant in the evaluation of screening and diagnostic tests because the individual is asked to trade perfect health to avoid hours in an unpleasant situation such as colonoscopy (Jonas *et al*., 2010), or to avoid the use of injected anesthesia (Matthews, 2002).

These methods have been adapted for the evaluation of THS (Wright *et al*., 2009). As such, ‘TTO with specific duration’ allows for a specific duration of the health state instead of being considered chronic; ‘Chained TTO’ uses an intermediate chained health status between the THS and perfect health.

Although techniques such as the chained TTO are considered suitable for evaluating THS (Locadia *et al*., 2004), there are a number of caveats in the use of traditional methods to obtain QALY values of utility over a health state, the most important is the assumption that utility is lineal to the duration and seriousness of the health state. Different authors claim that utility is not only non- independent of the length and severity of the health state but that people have preferences over the duration of the health state (Bleichrodt and Johannesson, 1997; Gafni, 1995; Guerrero and Herrero, 2005; Loewenstein and Prelec, 1993; Ross and Simonson, 1991; Spencer and Robinson, 2007; Torrance, 1986; Tsuchiya and Dolan, 2005). In fact, the weight of time on utility over a health state increases the longer the period in bad health (Bala *et al*., 1999; Shiroiwa *et al*., 2013).

Preferences scores for one year of full-health *vs*. one year in an impaired health state are not the same as preferences for 20 years in full-health *vs*. 20 years in an impaired health state.

Moreover, the aggregation of individual's gain in QALY to measure the societal benefit is questionable since it implies that preferences for 100 people gaining 10 years of 0,05 quality should be the same as 5 people gaining 10 years of full health, (Duru *et al*., 2002; Weinstein, 1988).

It is, therefore, opportune to analyze alternatives for THS evaluation and, especially, for the evaluation of screening or diagnostic tests, therapies or surgery with very short duration as these might result underestimated if traditional health evaluation methods are used (Heidenreich, 2011).

This chapter obtains the monetary value of the utility of avoiding THS, estimating mean WTP to avoid coronary angioplasty to implant a DES, an operation that is described as short and uncomplicated but with an important emotional burden (Koivula *et al.*, 2001). This emotional burden is also considered in the analysis as individuals WTP is estimated according to their stated level of fear and anxiety related to angioplasty. The aim is twofold; first, to prove whether the monetary value of avoiding an operation reflects the lost in utility, measured in QALYs. And second, to test the influence of emotions in the perception of health benefits and, consequently, its contribution to changes in WTP values.

WTP is estimated with a contingent valuation (CV) survey where angioplasty to implant a DES is defined as a simple procedure. Individuals are asked if they are willing to pay for a treatment with pills that would substitute angioplasty having similar results. They are also asked for their level of fear and anxiety related to angioplasty, allowing further tests on emotions influencing WTP. This chapter emphasizes the suitability of WTP as a direct method of evaluation to overcome QALY methodological limitations. Monetary evaluation provides a unique value that incorporates the utility of the health state and utility/disutility of perceptions and opportunity costs.

This chapter continues as follows. Next section describes the questionnaire used to obtain the data. Section 3 presents the model used to obtain mean WTP estimates. Section 4 includes the results. The discussion in Section 5 includes a simulated cost-effectiveness analysis for the treatment with pills. This section includes, as well, the concluding remarks.

3.2 Material and data

To obtain the monetary value of avoiding angioplasty, a CV survey was designed (see Annex 1) and 1,663 individuals participated. The interviews were conducted using a Computer Assisted Personal Interview (CAPI) methodology in February-April 2009. The sampling universe was older than 19 years old population living in Spain.

Survey design

The questionnaire was divided in three main sections:

First section: General information

In the first section participants were informed about the objectives and nature of the study. The interviewer provided information about causes and symptoms of coronary arteries occlusion and how it is usually solved with an angioplasty to implant an stent. Angioplasty was explained in detail and described as a mild intervention mentioning that, usually, patients can walk after six hours, leave the hospital within 24 hours and be fully recovered in a week. The interviewer explained an option to avoid angioplasty: a treatment with pills that produce the same benefit that a DES. The reduction in the probability of restenosis with the treatment with pills and with angioplasty is the same. The only benefit of the treatment with pills over DES is to avoid angioplasty to implant it. The description was facilitated with cards and drawings. Then, individuals were asked if they have understood the process entirely and whether they have any questions. When it was needed the interviewer repeated the information again.

Second section: Evaluation task

In this section participants respond to a set of questions on their WTP for the pill that substitute angioplasty. An initial question identified those individuals having positive WTP for the pill: “How would you treat restenosis? Option A: Pill; Option B: DES”. Cost information was not provided at this point of the survey and the choice was made only considering the benefit of avoiding the operation. Individuals choosing not to pay for the pill did not continue with the questionnaire after this point.

Those with a positive WTP proceeded with the evaluation task consisting on a choice scenario with a bid and three possible options, YES (I would pay), NO (I wouldn’t pay) or not providing the answer (N/A). The interviewer showed a card with a price in the computer screen and asked the participant if s/he would accept to pay that price for the pill. If the respondent accepted to pay the bid, a second question followed with a higher price. If the respondent rejected to pay the first bid, the second question included a lower price.

The default option for those not accepting the bid is the *status quo,* a PCI to implant a DES without any out-of-pocket payment. When the participant accepts to pay, the payment vehicle is one-payment at the moment of the decision in the hospital. The values of the first bid are selected randomly from a set of bids. First and follow-up bids are shown in Table 3.1. The bids were tested in a sample survey with 100 observations in order to test if the range is wide enough to reflect the true WTP curve.

Table 3.1 Bids (€)		
First bid	*Follow-up bid*	
100	bid_{up} bid_{down}	400 30
400	bid_{up} bid_{down}	900 100
900	bid_{up} bid_{down}	1,500 400
1,500	bid_{up} bid_{down}	3,000 900
3,000	bid_{up} bid_{down}	6,000 1,500
6,000	bid_{up} bid_{down}	12,000 3,000
18,000	bid_{up} bid_{down}	30,000 12,000

Next, the questionnaire included a question on the level of fear and anxiety associated with angioplasty to implant a DES. The individuals state their level of fear and anxiety in a Likert scale (0-10), where 0 denotes absence of fear or anxiety and 10 represents the maximum level of fear and anxiety.

Third section: Socio-economic information

Information was collected on age, gender, schooling, occupation, family size and net disposable income, also a few notes on participants' attitude and understanding.

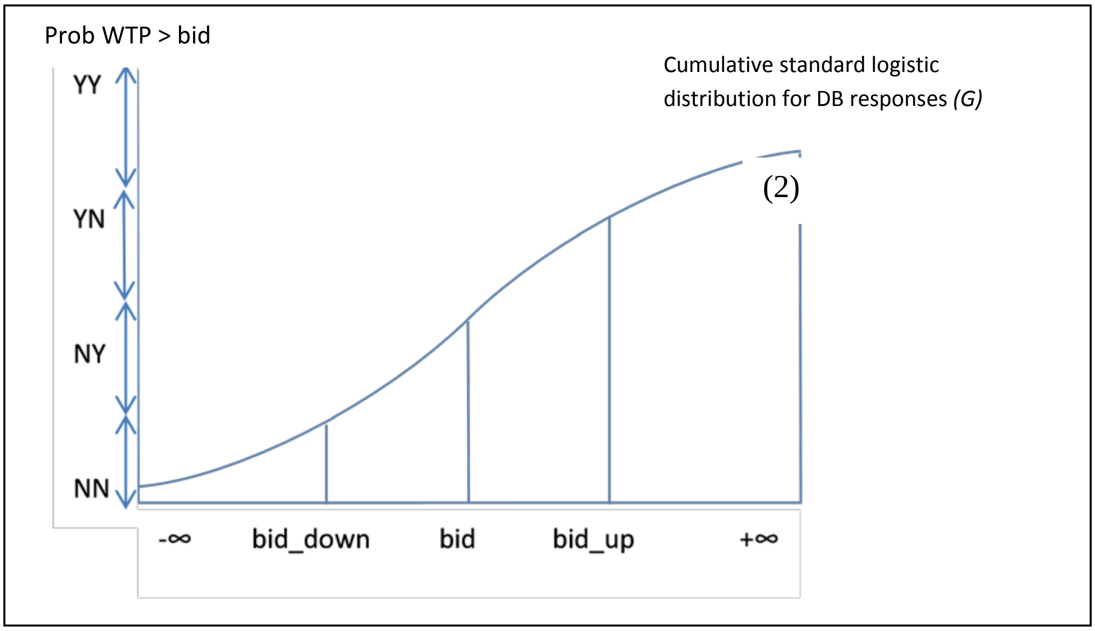
3.3 Methodology

Double Bounded Dichotomous Choice Model

In the empirical exercise, individual responds to a double question on WTP to avoid angioplasty. There are three possible responses: yes, no or not providing a response. The individual is offered an initial amount (bid) and is asked (q_1) whether s/he is willing to pay that amount for the health benefit. If the individual accepts to pay the bid, s/he is offered a second bid that is higher (bid_{up}) and is asked (q_2) whether s/he would pay that amount. If the individual rejects the first bid, s/he is offered a second bid that is lower (bid_{down}), and is asked again if s/he would pay the amount. If an individual answers 'yes' to the first bid (q_1=Y) and also accepts to pay the second bid (q_2 =Y) the sequence of responses is represented as YY. If an individual answers 'no' to the first bid (q_1=N) and answers 'no' to the second bid (q_2 =N), the sequence of responses is represented as NN. If the individual accepts the first bid and rejects the second one, the sequence of responses is YN, and if s/he rejects the first bid and accepts the second bid, the sequence of responses is NY.

The response to each bid will depend on the comparison between the individual's WTP and the bids. Individual will say yes if his WTP is higher than the bid, and no otherwise. Assuming that individual's WTP doesn't change between the initial and the follow-up question, the two responses allow knowing the interval where the individual's WTP falls (see Figure 3.1).

Figure 3.1 WTP intervals obtained from the double-bounded questions.



Let's assume that the WTP for individual *i* (WTP_i) can be represented as,

$$WTP_i = \mu + \varepsilon_i \, , \qquad (1)$$

where ε_i is an error term following a logistic distribution with a mean of 0 and a variance of $\tau^2 \frac{\pi^2}{3}$, being τ the scale parameter.

Under this framework, the probability of the response combinations is given by (Hanemann *et al*., 1991):

(i.) q1=Y, q2=Y

$$
\begin{aligned}
&\Pr\left(YY\right)=\Pr\left(WTP_i > bid_1, WTP_i \geq bid_{up}\right)\\
&=\Pr\left(WTP_i \geq bid_{up}\right)\\
&=\Pr\left(\mu_i+\varepsilon_i \geq bid_{up}\right)\\
&=\Pr\left(\varepsilon_i \geq bid_{up}-\mu\right)\\
&=1-G\left(\frac{bid_{up}-\mu}{\tau}\right).
\end{aligned}
\tag{2}
$$

(ii.) q_1=N, q_2=N

$$
\begin{aligned}
&\Pr\left(NN\right)=\Pr\left(WTP_i < bid_1, WTP_i < bid_{down}\right)\\
&=\Pr\left(WTP_i < bid_{down}\right)\\
&=\Pr\left(\mu_i+\varepsilon_i < bid_{down}\right)\\
&=\Pr\left(\varepsilon_i < bid_{down}-\mu\right)\\
&=G\left(\frac{bid_{down}-\mu}{\tau}\right).
\end{aligned}
\tag{3}
$$

(iii.) q_1=Y, q_2=N

$$
\begin{aligned}
&\Pr\left(YN\right)=\Pr\left(WTP_i \geq bid_1, WTP_i < bid_{up}\right)\\
&=\Pr\left(bid_1 \leq WTP < bid_{up}\right)\\
&=\Pr\left(bid_1 \leq \mu_i+\varepsilon_i < bid_{up}\right)\\
&=\Pr\left(\frac{bid_1-\mu}{\tau} \leq \frac{\varepsilon_i}{\tau} < \frac{bid_{up}-\mu}{\tau}\right)\\
&=G\left(\frac{bid_{up}-\mu}{\tau}\right)-G\left(\frac{bid_1-\mu}{\tau}\right).
\end{aligned}
\tag{4}
$$

(iv.) q_1=N, q_2=Y

$$
\begin{aligned}
\Pr\left(NY\right) &= \Pr\left(WTP < bid_1, WTP \geq bid_{down}\right) \\
&= \Pr\left(bid_{down} \leq WTP < bid_1\right) \\
&= \Pr\left(bid_{down} \leq \mu_i + \varepsilon_i < bid_1\right) \\
&= \Pr\left(\frac{bid_{down} - \mu}{\tau} \leq \frac{\varepsilon_i}{\tau} < \frac{bid_1 - \mu}{\tau}\right) \\
&= G\left(\frac{bid_1 - \mu}{\tau}\right) - G\left(\frac{bid_{down} - \mu}{\tau}\right).
\end{aligned} \tag{5}
$$

Estimates for $\gamma = -\frac{1}{\tau}$ and $\alpha = \frac{\mu}{\tau}$ are obtained by applying maximum-likelihood estimation. The log-likelihood function for this model is:

$$
\begin{aligned}
\sum_{i=1}^{N} \Bigg[& I_i^{YY} \ln\left(1 - G\left(\frac{bid_{up} - \mu}{\tau}\right)\right) + \\
& I_i^{NN} \ln\left(G\left(\frac{bid_{down} - \mu}{\tau}\right)\right) + \\
& I_i^{YN} \ln\left(G\left(\frac{bid_{up} - \mu}{\tau}\right) - G\left(\frac{bid_1 - \mu}{\tau}\right)\right) + \\
& I_i^{NY} \ln\left(G\left(\frac{bid_1 - \mu}{\tau}\right) - G\left(\frac{bid_{down} - \mu}{\tau}\right)\right) \Bigg].
\end{aligned} \tag{6}
$$

Mean WTP for the pill (*p*) is given by:

$$E(WTP_p) = \mu_p = -\frac{\alpha_p}{\gamma_p}.$$

3.4 Results

Those who were not willing to pay for a DES in the first section of the questionnaire (N=149) did not continue with the questionnaire after that point. In addition, 114 individuals preferred an angioplasty to treat the restenosis over the treatment with pills, and did not continue with the questionnaire. Specified causes to reject to pay for the pills were the idea of the operation being more effective, and fear to side and long-term effects of the treatment with pills. Observations for one individual that answered “N/A” to a bid and from 8 individuals that did not provide information about fear and anxiety related to angioplasty were not considered. Final sample size was 1,391 individuals.

Individuals were distributed in two groups according to their stated level of fear and anxiety related to the operation. As such those with levels 8, 9 and 10 were assigned to the High Fear (HF) group (N=705); and individuals with level 7 and below to the Low Fear (LF) group (N=686). The threshold in level 7 is based on response distribution, choosing the level of fear that left half of the survey population in each group.

Respondents show strong support for avoiding angioplasty. Responses to the initial question on preferences to treat restenosis with an angioplasty or swallowing a pill are clear, 92.5% of respondents opts for avoiding angioplasty. Response distribution according to gender, level of studies and labour are presented in Table 3.2

This support for avoiding surgery grants a solid first step to the study since estimating the monetary value of a health technology that is not socially appealing would weaken the results.

Table 3.2 Response distribution and socioeconomic characteristics of survey participants

	YES (% over row) (% over column)	NO (% over row) (% over column)
Female (746)	91.69 48.86 (684)	8.31 54.39 (62)
Male (768)	93.23 51.14 (716)	6.77 45.61 (52)
No studies (88)	94.32 5.95 (83)	5.68 4.39 (5)
Elementary and Middle School (813)	92.49 53.94 (752)	7.51 53.51 (61)
High School (349)	89.97 22.53 (314)	10.03 30.71 (35)
Bachelor, Master and PhD (248)	95.16 16.93 (236)	4.84 10.53 (12)
Not employed (606)	91.91 39.81 (557)	8.09 42.98 (49)
Employed (907)	92.83 60.19 (842)	7.17 57.02 (65)

WTP to avoid angioplasty

Table 3.3 presents estimates of coefficients α and γ, t-statistics and WTP for the complete sample, as well as individuals distributed according to their stated level of fear related to angioplasty. Coefficients of the model behave as expected; bid coefficient is negative and all coefficients are statistically significant at 1% level. Mean WTP for the pill is 5,692.87 € for all individuals participating in the survey, higher than findings from Greenberg *et al*. (2004) who obtained WTP of 1,162$ to reduce all risk of restenosis (estimated as a 30 percent reduction) and from Guertin *et al*. (2011) who obtained WTP 2,802$ to reduce the probability of restenosis to 0.

Table 3.3 DB model coefficients and mean WTP

	Complete sample (N=1,391)	**LF group (N=686)**	**HF group (N=705)**
Estimate	**Coefficient (t-statistics)**	**Coefficient (t-statistics)**	**Coefficient (t-statistics)**
Constant	1.0539*** (14.853)	.77877*** (8.047)	1.3895*** (12.948)
Bid	-.00018*** (-28.334)	-.00022*** (-22.709)	-.00017*** (-18.208)
WTP (€)	5,692.87	3,599.37	8,207.45
Standard Deviation	297.22	374.48	464.46
95% CI	(4,867.61 6,512.63)	(2,681.26 4,516.48)	(6,802.49 9,650.38)
LogL	1711.25	911.63	768.78

***p<0.01

Monetary value of avoiding angioplasty is higher for HF than LF individuals. WTP is more than double for HF individuals (8,207.45€) than for LF individuals (3,599.37€). These results show less variability than Ploegmakers *et al*. (2010); in their research, they obtained WTP estimates from patients, cardiologist and nurses valuing their utility of avoiding recurrent symptoms and a repeat angioplasty. WTP estimates for avoiding angioplasty varied from 600$ to 75,000$.

3.5 Discussion and Concluding Remarks

QALY methodology considers that shorter duration of discomfort is a benefit, but that utility of avoiding it is proportional to duration. In this chapter, people value avoiding angioplasty, which is a short, uncomplicated surgery. They value a benefit that in terms of QALYs is modest (see Table 3.4). In fact, this short, uncomplicated operation and a couple of weeks of some discomfort might have very small utility value in terms of QALYs (Ploegmakers *et al*., 2010).

However, results provided in this chapter show a high monetary value for avoiding this short intervention. It is necessary to think of a very high monetary value per QALY that justifies the WTP to avoid a health state that is not considered severe. Estimates of QALYs lost in an angioplasty range from 0.0035 in Hill *et al*., (2004) to 0.08 in Shrive *et al*., (2005)[1], which means a monetary value from 1,626,534.28€ /QALY (5,692.87 /0.0035) to 71,160.87€ /QALY, using the estimates for the complete sample (see Table 3.4). These amounts exceed by far the cost per QALY thresholds of 25,000£-35,000£/QALY in the UK (Rawlins and Culyer, 2004), of 20,000€-80,000€ (for severe diseases)/QALY in The Netherlands (Vemer and Rutten-van Mölken, 2011), and of 50,000$/ QALY and 50,000CAD$/ QALY in EEUU and Canada, respectively (Einsenber, 2006).

Individuals perceive a benefit that is not proportional to the duration of the health state, especially those declaring high levels of fear and anxiety related to angioplasty. They are not just willing to pay to avoid some discomfort that lasts a few

[1]Differences in QALY’s measure depend on the utility over the follow-up procedure and the length of the time frame used in the analysis.

days but they are willing to pay to avoid a situation they perceived with fear and anxiety.

The cost that would make the treatment with pills cost-effective, using a threshold of 40,000€/QALY, would range from 140€ – 3,200€; far below the monetary value that individuals have expressed in this study.

Findings suggest that WTP methodology captures personal perceptions that individuals do value, in line with Birch *et al*. (1999) and has already been considered an alternative for acute disease economic evaluation (Bala *et al*., 2000).

Results show that WTP estimations capture the influence in health preferences of relevant personal factors such as emotions related to a given health state, not just quantity and quality of the health state. The main issue is to what extent health services should devote public resources to reduce fear and anxiety associated with an intervention. After all, these feelings may be somehow irrational since it does not seem that the intervention is so invasive to justify this feelings. However, it would be surprising that the health system decides to spend money in the curation of situations of anxiety that can be linked to an illnes but then consider that the anxiety that generates the perspective of a medical intervention does not justify to spend public funding because this anxiety is irrational.

Avoiding this short intervention is a small benefit which individuals value highly and this premise challenges THS economic evaluation.

Table 3.4 Monetary value for a QALY (€) and Cost-Effectiveness analysis.					
Gain in QALYs of avoiding angioplasty	Conditions of disutility measured in the literature reviewed	Monetary value for a QALY (€/QALY)			Threshold 40,000€/QALY
		Complete group	LF group	HF group	
0.0 (Ploegmakers *et al*., 2010)	Disutility for restenosis and revascularization	-	-	-	0
0.0035 (Hill *et al*., 2004)	Disutility for surviving stented patients spread over 6 weeks	1,626,534.29	1,028,391.43	2,344,985.71	140
0.0056 (Bagust *et al*., 2006)	QALY lost in angioplasty (Bagust *et al*., 2006)	1,016,583.93	642,744.64	1,465,616.07	224
0.01 (Kaiser *et al*., 2005)	QALY gains for DES *vs*. BMS patients. (VAS)	569,287.00	359,937.00	820,745.00	400
0.0104 (Bischof *et al*., 2009)	Loss in QALY for up to 6 months after PCI	547,391.35	346,093.27	789,177.88	416
0.015 (Cohen *et al*., 2001)	QALYs of patients with stent *vs*. PTCA patients	379,524.67	239,958.00	547,163.33	600
0.018 (Neyt *et al*., 2007)	Disutility of restenosis, 4 four-week waiting time	316,270.56	199,965.00	455,969.44	720
0.02 (Hill *et al*., 2004)	QALY angina symptoms prior to revascularization	284,643.50	179,968.50	410,372.50	800
0.024 (Hill *et al*., 2007)	QALYs for angina- QALYs for angina free states, 6-week waiting time	237,202.92	149,973.75	341,977.08	960
0.04-0.6 (Groeneveld *et al*., 2007)	QALY decrement for restenosis patients	142,321.75-94,881.17	89,984.25-59,989.50	205,186.25-136,790.83	1,600-2,400
0.041 (Sullivan *et al*., 2006)	Disutility of MI for patients with diabetes mellitus	138,850.49	87,789.51	200,181.71	1,640
0.05 (Kaiser *et al*., 2005)	QALY gains for DES *vs*. BMS patients (EQ-5)	113,857.40	71,987.40	164,149.00	2,000
0.06 (Cohen *et al*., 2001)	QALY for patients not requiring repeat revascularization *vs* .those who did	94,881.17	59,989.50	136,790.83	2,400
0.08 (Shrive *et al*., 2005)	QALY event free – QALY event; event is defined as the need for repeat catheterization	71,160.88	44,992.13	102,593.13	3,200

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CONCLUSIONES

Esta Tesis aporta evidencia empírica sobre el impacto de las emociones relacionadas con el bien que se valora en las encuestas de valoración contingente (VC). Se aporta evidencia en el campo de la Economía de la Salud, donde la valoración monetaria de resultados en salud contiene una carga emocional importante. Los datos obtenidos a través de encuestas de VC se utiliza en análisis de coste-efectividad y coste-utilidad para nuevos tratamientos y no existe una literatura extensa que analice el impacto de las emociones en la disposición a pagar (DAP).

El primer capítulo aporta un estudio pionero sobre DAP y emociones que analiza la influencia de las emociones en la medición de preferencias (utilidad) utilizando la metodología de las preferencias declaradas. Los resultados muestran una influencia significativa de las emociones en las preferencias de los individuos sobre el *stent* liberador de fármacos (SLF), medidas como DAP por este tipo de *stent*. Individuos con niveles altos de miedo relacionado con la angioplastia muestran una DAP más alta que los otros individuos. Esta diferencia en DAP entre los dos grupos es estadísticamente significativa y se mantiene para todos los niveles considerados de beneficios en salud producidos por el uso del DES. El estudio muestra, además, que la utilidad marginal de reducir la probabilidad de restenosis, que es el beneficio que produce el SLF, es mayor en individuos sin miedo.

Al estimar los modelos *Double-Bounded* (DB) y *Random Effects* (REM) para obtener la DAP, variables como género y nivel educativo (años de estudio) resultan estadísticamente significativas, independientemente del nivel de miedo.

El segundo capítulo se centra en el análisis del efecto del aprendizaje en la reducción de diferencias entre estimaciones de DAP obtenidas de un modelo *single-bounded* (SB) y de las obtenidas con una respuesta adicional según un modelo *double-bounded* (DB) Así, se diseñó un cuestionario en el que cada individuo realizaba cuatro ejercicios de evaluación, con dos preguntas con respuesta dicotómica cada uno. Además, el diseño permitía el uso de dos secuencias diferentes, ascendente y descendente, que sólo coincidían en la evaluación final, que valoraba el mismo bien en las dos encuestas.

Los resultados muestran que no hay aprendizaje, a pesar de que se dan las condiciones para ello, ya que en la primera evaluación existen diferencias estadísticamente significativas entre las estimaciones de SB y DB en todos los grupos, solamente en el caso de individuos con miedo bajo que evalúan la secuencia ascendente estas diferencias no son estadísticamente significativas. Para los demás grupos las diferencias entre SB y DB se mantienen a lo largo de toda la encuesta, independientemente del nivel de miedo de los individuos y de la magnitud del beneficio que se valora en primer lugar.

A pesar de este comportamiento anómalo con diferencias persistentes entre SB y DB, no existen efectos de secuencia. Así, la DAP obtenida con la primera respuesta de los individuos de una secuencia no es diferente de la DAP con la respuesta SB de los individuos de la otra secuencia. Lo mismo ocurre con la DAP obtenida con la primera y la segunda respuesta, el modelo DB.

El tercer capítulo aporta un análisis sobre la evaluación económica de los estados de salud temporales (EST). Se considera aquí como EST la operación para implantar el *stent*, la angioplastia, que no es grave pero sí puede resultar molesta y, sobre todo, que provoca rechazo en pacientes por el temor a pasar por el quirófano para una operación de corazón.

De esta manera se quiere evaluar si el valor monetario de evitar esta operación es coherente con el valor estimado en Años de Vida ajustados por Calidad (AVACs). Los resultados muestran que la utilidad de evitar la operación (5,692.87€) es mucho mayor que el valor que un tratamiento con pastillas que evitara la operación debería tener para resultar coste-efectivo (140€-3200€).

Este tipo de análisis muestra la dificultad para evaluar tratamientos que eviten EST con la metodología AVAC, especialmente cuando se trata de situaciones que duran pocos días o incluso horas como es el caso de test de *screening* o de diagnóstico.

Este capítulo es, por tanto, una aportación al debate sobre las limitaciones de la metodología AVAC y presenta como alternativa el uso del valor monetario o DAP. Las estimaciones de DAP pueden capturar el impacto en las preferencias de los individuos no sólo del cambio en la calidad de vida atribuida a la gravedad y duración de una enfermedad, como miden los AVACs, sino también de otros factores. Esto explica que la valoración de los AVACs no sea proporcional a la duración y la gravedad del estado de salud.

El hecho de que un tratamiento o un test de diagnóstico sea menos agresivo o incómodo es un beneficio en sí mismo, y estimaciones como la DAP por este tratamiento así lo muestran.

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ANNEX 1

1ª PARTE: PRESENTACIÓN DE LA ENCUESTA

El objetivo de esta encuesta es conocer como personas como usted, valoran algunos tratamientos médicos para problemas de corazón. Para contestar a esta encuesta, no es necesario que usted haya tenido un problema de este estilo. Basta con que nos diga lo que usted cree que haría si estuviera en alguna de las situaciones que le vamos a presentar. Aunque ya sabemos que es difícil valorar situaciones en las que uno mismo no ha estado, le pediremos que haga un esfuerzo e intente responder a las preguntas que se le harán pensando en lo que usted cree que haría en cada caso. Si en cualquier momento usted no desea responder a alguna de las preguntas o desea no seguir con la encuesta, está en un derecho de hacerlo.

La encuesta se realiza a un gran número de personas, ha sido diseñada por profesores universitarios y se financia con fondos públicos. Por tanto, si usted es tan amable de contestar a la misma, colaborará con la investigación que está llevando a cabo la Universidad y, por tanto, ayudará a que las autoridades sanitarias conozcan mejor lo que piensa la sociedad sobre estas enfermedades y sobre la forma de tratarlas.

A continuación se le dará información que le ayudará a comprender mejor el problema de salud que queremos que usted valore.

OBJETIVO DEL ESTUDIO: Conocer la valoración y su opinión acerca de diferentes tratamientos médicos para el problemas del corazón.

QUIEN DIRIGE: Es un estudio dirigido por profesores de la universidad y financiado con fondos públicos.

2ª PARTE: INFORMACION SOBRE ESTENOSIS CORONARIA

MOSTRAR TARJETA Nº 1: ESTENOSIS CORONARIA

En esta encuesta nos centraremos en una enfermedad cardiovascular, como es la estenosis coronaria. Le comentaremos de forma muy simple en qué consiste**.**

Todos los órganos del cuerpo necesitan sangre para vivir. El corazón es el que se encarga de enviar sangre a todos los órganos del cuerpo. Hasta el propio corazón se envía sangre a sí mismo a través de unas arterias especiales llamadas arterias coronarias. Algunos factores de riesgo como el colesterol elevado, la presión arterial elevada (hipertensión), la edad o el tabaco, hacen que estas arterias se vayan llenando de grasa. La grasa acumulada dificulta y, hasta puede llegar a obstruir completamente el paso de la sangre al corazón. A medida que aumenta el grado de obstrucción, se reduce el flujo de sangre al corazón y en determinadas circunstancias aparece dolor en el pecho o el hombro. Puede tratarse de un problema transitorio (angina de pecho) o de un problema más grave, como una obstrucción total de la arteria (infarto agudo de miocardio). Los pacientes describen ambos problemas como sensación de asfixia, presión o ardor en el pecho. El dolor generalmente se produce cuando el corazón necesita un mayor aporte de sangre, como durante el ejercicio físico o en momentos de estrés emocional.

TARJETA Nº1: ESTENOSIS CORONARIA

Los órganos del cuerpo necesitan sangre para vivir.

El corazón envía sangre a todos los órganos, incluso a sí mismo a través de las arterias coronarias.

Estas arterias se van llenando de grasa, dificultando la llegada de sangre debido a la obstrucción producida.

Factores de Riesgo que obstruyen las arterias:

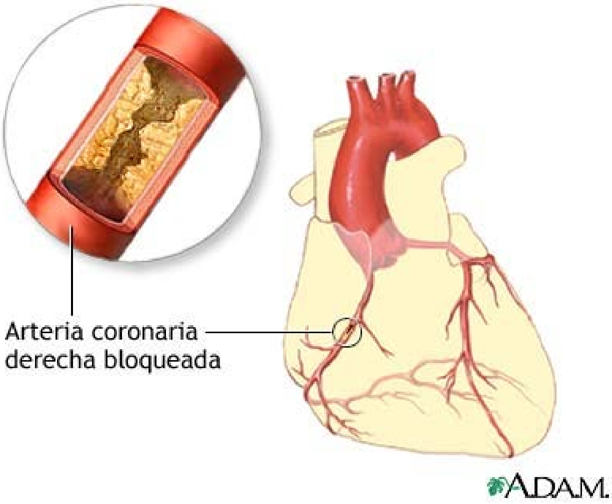
- Colesterol elevado.
- Hipertensión(tensión arterial elevada)
- Edad.
- Tabaco…

Consecuencias: Dolor en el pecho u hombro (sobre todo cuando se necesita mayor aporte de sangre, es decir, en actividades físicas y situaciones de estrés emocional). Sensación de asfixia, presión o ardor en el pecho.

Problema Transitorio = Angina de Pecho.

Obstrucción Total =Infarto Agudo de Miocardio

TARJETA N°1: ESTENOSIS CORONARIA. Dibujo 1



P1. ¿Conoce gente cercana a Ud. (un pariente, un amigo, conocido..) que haya tenido un problema grave de corazón (angina de pecho, infarto,...)?

SI	1
NO	2
NS/NC	99

3ª PARTE: TRATAMIENTO DE LA ESTENOSIS CORONARIA

MOSTRAR TARJETA Nº 2: TRATAMIENTO DE LA ESTENOSIS CORONARIA

Este problema de salud se suele tratar mediante un procedimiento que se denomina “angioplastia”. La angioplastia, es un procedimiento que utiliza un tubo largo y delgado denominado «catéter» que lleva un pequeño globo (o balón) en la punta. Este tubo se desliza por un vaso sanguíneo desde la ingle a través de la aorta hacia el corazón. Es una intervención relativamente sencilla y con pocos riesgos. No requiere anestesia general. La hospitalización promedio generalmente es de menos de 2 días y es posible que algunas personas ni siquiera tengan que permanecer allí de un día para otro. En general, los pacientes a quienes se les practica una angioplastia pueden caminar más o menos a las 6 horas después del procedimiento y la recuperación total se produce, como mucho, al cabo de una semana.

TARJETA Nº 2: TRATAMIENTO DE LA ESTENOSIS CORONARIA

ANGIOPLASTIA: Deslizar un tubo (catéter) a través de la aorta (ingle) hasta el corazón. Es una intervención relativamente sencilla y con pocos riesgos. No requiere anestesia general. La hospitalización promedio generalmente es de menos de 2 días y es posible que algunas personas ni siquiera tengan que permanecer allí de un día para otro. En general, los pacientes a quienes se les practica una angioplastia pueden caminar más o menos a las 6 horas después del procedimiento y la recuperación total toma una semana o menos.

INDICAR DIBUJO 1 TARJETA Nº 2: TRATAMIENTO DE LA ESTENOSIS CORONARIA

El catéter lleva en la punta un globo (balón) que los médicos inflan en el lugar de la arteria donde se encuentra la obstrucción para comprimir la grasa contra la pared arterial.
Esto hace que la sangre vuelva a fluir de forma normal, pero en algunos pacientes la grasa vuelve a crecer y a obstruir la arteria. El paciente vuelve a tener los síntomas antes descritos (dolor en el pecho – brazo, dificultad respiratoria….)

INDICAR DIBUJO 2 TARJETA Nº 2: TRATAMIENTO DE LA ESTENOSIS CORONARIA

Para evitar esto, se suele dejar dentro de la arteria una especie de “malla” denominada **STENT**

INDICAR DIBUJO 3 TARJETA Nº 2: TRATAMIENTO DE LA ESTENOSIS CORONARIA

Existen dos tipos de **STENT:**

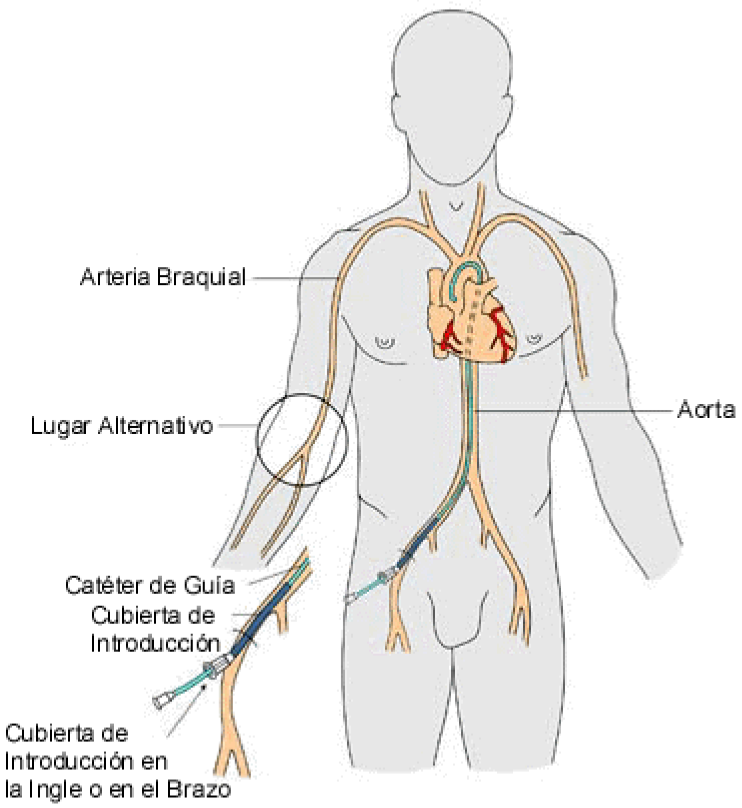
1. **STENT SIN MEDICAMENTO:**
    - Mantienen la arteria abierta.
2. **STENT CON MEDICAMENTO.**
    - Mantiene la arteria abierta.
    - El medicamento dificulta la acumulación de grasa en la arteria, por tanto, es *menos probable* tener que volver a operar.
    - Sin embargo, **en los dos casos**, la grasa puede volver a crecer dentro del **STENT** y se puede volver a cerrar la arteria, reduciendo el flujo sanguíneo al corazón, volviendo a tener los síntomas antes descrito, lo que reduce su calidad de vida y teniendo que volver a ser intervenido

INDICAR DIBUJO 4 TARJETA Nº 2: TRATAMIENTO DE LA ESTENOSIS CORONARIA

- La necesidad de reintervenir depende de varias circunstancias, entre otras del tipo de malla **(STENT)** que se ponga. Si llevan medicamento, se tiene que volver a operar en menos ocasiones.

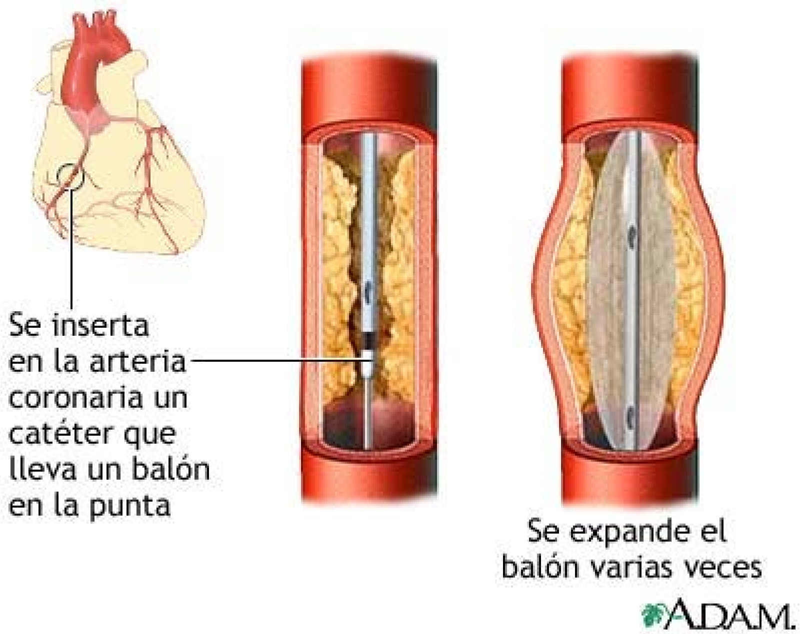
NOTA: EN NINGUNO DE LOS DOS CASOS SE ASEGURA QUE NO SE TENDRÁ QUE INTERVENIR EN EL FUTURO

TARJETA N° 2: TRATAMIENTO DE LA ESTENOSIS CORONARIA. Dibujo 1



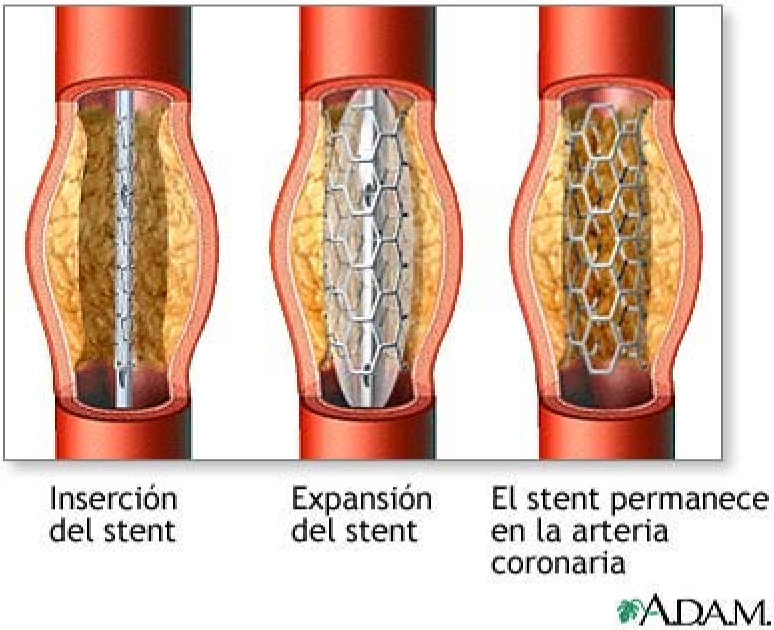
Los médicos inflan el globo en el lugar de la arteria donde se encuentra la obstrucción para comprimir la grasa contra la pared arterial.

TARJETA N° 2: TRATAMIENTO DE LA ESTENOSIS CORONARIA. Dibujo 2



Este procedimiento deja la arteria abierta y puede volver a pasar la sangre. Sin embargo, en algunos pacientes, al cabo de algún tiempo, vuelve a crecer la grasa en el mismo sitio y se vuelve a obstruir la arteria. Si eso ocurre, de nuevo aparecen los síntomas de dificultades en la respiración, dolor en el pecho, etc. Para intentar que esto no ocurra, se suele dejar dentro de la arteria una especie de malla que se denomina “stent”.

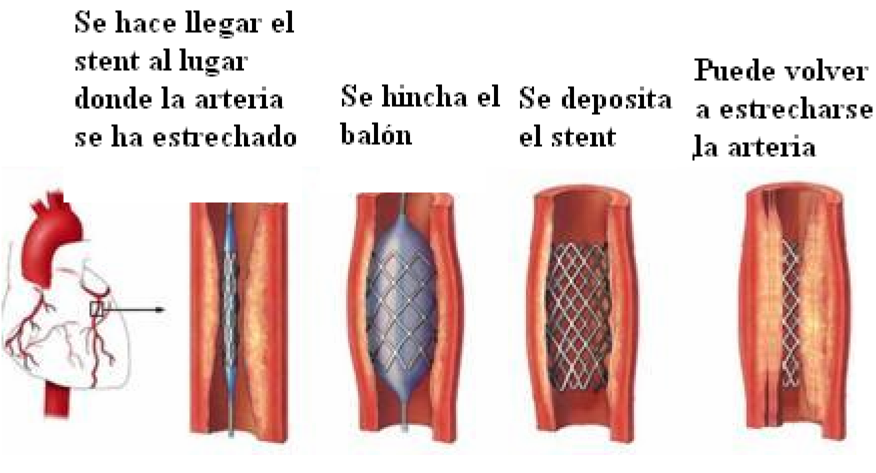
TARJETA N° 2: TRATAMIENTO DE LA ESTENOSIS CORONARIA. Dibujo 3



Como puede apreciar, la malla se queda dentro de la arteria para que no se vuelva a cerrar.

Sin embargo, la grasa puede volver a crecer dentro del stent y se puede volver a cerrar la arteria, reduciendo el flujo sanguíneo al corazón. A continuación puede ver todo el proceso.

TARJETA N° 2: TRATAMIENTO DE LA ESTENOSIS CORONARIA. Dibujo 4



En el caso de que la arteria se vuelva a cerrar, el paciente tiene que volver a empezar todo el proceso de nuevo. Hay pacientes que vuelven a notar los mismos síntomas de dolor de pecho y dificultades respiratorias, tienen que volver al médico y será necesario volver a repetir la intervención quirúrgica. Por tanto, durante los meses que pasan desde que se notan los síntomas hasta que se le vuelve a operar, usted tendría su calidad de vida reducida, ya que los síntomas de dificultades en la respiración, dolor en el pecho, etc. durarían hasta que se volviera a operar (unos 6 meses, ahora mismo).

La necesidad de reintervenir depende de varias circunstancias, entre otras del tipo de “malla” (stent) que se ponga. De forma general, podemos afirmar que existen dos tipos de stents:

1. Los que NO llevan medicamento, que cumplen la función de mantener abierta la arteria.

2. Los que van recubiertos de un medicamento, que además de mantener abierta la arteria, hacen que la grasa no se vuelva a acumular tan fácilmente. Si se utiliza este tipo de mallas con medicamento, es menos probable que se tenga que volver a intervenir. En ningún caso garantizan al 100% que no haya que volver a operar. Se ha comprobado que los efectos secundarios de este medicamento son despreciables.

En cualquier caso, el tipo de intervención quirúrgica es exactamente igual, y en ambos casos conlleva el mismo riesgo.

MOSTRAR TARJETA Nº3: EJEMPLO DE STENT CON Y SIN MEDICAMENTO Y SUS EFECTOS

En la realidad, el riesgo de tener que volver a operarse varía según las características del paciente. Esto es, en algunos tipos de pacientes, si le ponen la malla normal, unos 40 de cada 100 tienen que volver a ser operados, en cambio, en otros tipos de pacientes, esto únicamente pasa en 10 de cada 100 pacientes. En el caso de las mallas con medicamento, normalmente no pasa de 5 de cada 100 los que tienen que volver a ser operados, aunque en algunos casos, puede ser algo más. A continuación, le presentamos 4 casos posibles:

TARJETA N°3: CASOS

Caso 1: Con la malla normal, 39 de cada 100 pacientes, como usted, que se operan, notan otra vez los síntomas y tienen que volver a operarse. Con la que tiene medicamento esto pasa en 7 de cada 100 pacientes. **BENEFICIO: De cada 100 pacientes como usted 32 menos tendrán que volver a operarse.**

Caso 2: Con la malla normal, 34 de cada 100 pacientes, como usted, que se operan, notan otra vez los síntomas y tienen que volver a operarse. Con la que tiene medicamento esto pasa en 7 de cada 100 pacientes. **BENEFICIO: De cada 100 pacientes como usted 27 menos tendrán que volver a operarse**

Caso 3: Con la malla normal, 29 de cada 100 pacientes, como usted, que se operan, notan otra vez los síntomas y tienen que volver a operarse. Con la que tiene medicamento esto pasa en 7 de cada 100 pacientes. **BENEFICIO: De cada 100 pacientes como usted 22 menos tendrán que volver a operarse.**

Caso 4: Con la malla normal, 24 de cada 100 pacientes, como usted, que se operan, notan otra vez los síntomas y tienen que volver a operarse. Con la que tiene medicamento esto pasa en 7 de cada 100 pacientes. **BENEFICIO: De cada 100 pacientes como usted 17 menos tendrán que volver a operarse.**

P2. ¿En cuál de estos cuatro casos cree usted que la malla con medicamentos produce MAYOR BENEFICIO?

CASO 1	
CASO 2	
CASO 3	
CASO 4	
NS/NC	99

P3. Nos fijamos ahora en los TRES CASOS RESTANTES ¿En cuál de los tres casos cree usted que la malla con medicamentos produce MENOR BENEFICIO?

CASO 1	
CASO 2	
CASO 3	
CASO 4	
NS/NC	99

P4. ¿De los DOS CASOS QUE QUEDAN, en cuál cree usted que la malla con medicamentos produce MAYOR BENEFICIO?

CASO 1	
CASO 2	
CASO 3	
CASO 4	
NS/NC	99

RESUMEN BÁSICO DE LO TRATADO HASTA EL MOMENTO

- Hay personas en las que la grasa se acumula en las arterias y pasa menos sangre al corazón (estenosis).
- Esto produce, primero, dolor de pecho y dificultades respiratorias.
- Si no se interviene, la arteria se puede obstruir del todo causando un infarto.
- El tratamiento requiere una intervención quirúrgica que consiste en meter un "balón" que se hincha y abre la arteria (angioplastia).
- Normalmente, se deja una malla (stent) para evitar que se vuelva a cerrar.
- Unos stents llevan medicamento y otros no.
- La intervención quirúrgica es exactamente igual con una u otra malla.
- No se puede garantizar al 100% que no se vuelva a cerrar la arteria.
- Si se pone la malla con medicamento, el riesgo de que se vuelva a cerrar la arteria, vuelva a sufrir los síntomas y haya que volver a intervenir es menor que si se pone la malla que NO lleva medicamento.

P5.¿Cree que ha entendido lo que se ha explicado hasta aquí?

SI	1
NO	2 → (ANOTAR y RESOLVER DUDAS)

4ª PARTE: SU DECISIÓN

Imagine ahora que Ud. tiene síntomas (dolor en el pecho, dificultades respiratorias...) y se le diagnostica un problema como el explicado antes: usted tiene la arteria muy cerrada y hay que operar.

Suponga que el médico le pregunta si quiere que le ponga una “malla” de las que llevan medicina o de las que no llevan medicina. El médico le dice que es usted quien tiene que tomar la decisión.

P6. Diga con cuál de las siguientes afirmaciones estaría usted más de acuerdo:

a. Le diría al médico que me pusiera la “malla” que lleva medicamento porque tengo menos riesgo de que se vuelva a cerrar la arteria y me tengan que volver a intervenir. → *Ir a P.7*

b. Le diría al médico que me pusiera la “malla” que NO lleva medicamento aunque tenga mayor riesgo de volver a tener el problema.

b.1. ¿Podría decirnos por qué preferiría la “malla” que no lleva

Medicamento? → *Anotar Razones ir a Pag. Bloque Datos Socio-Demográficos.*

Nota: Comprobar que las razones expuestas no son debidas a una falta de comprensión de los conceptos tratados hasta el momento

SECCIÓN 1

Usted ha dicho antes que, si le tuvieran que operar, preferiría la malla que lleva medicamento, ya que así es más difícil que le tengan que volver a operar. En España, por regla general esto lo paga la Seguridad Social y a usted no le costaría nada. Sin embargo, imagínese que vive en un país en donde la Seguridad Social únicamente le paga la malla que NO lleva medicamento. Suponga que si usted quiere la malla mejor, se tiene que pagar la diferencia. A continuación le haremos algunas preguntas relacionadas con esto.

ADVERTENCIA: en este tipo de encuestas, nuestra experiencia y la de otros investigadores, es que hay personas con respuestas muy extremas. Hay algunas que dicen que SÍ a cualquier cantidad, ya que no la van a pagar en la realidad, al ser esto únicamente una pregunta de una situación que no es real. Estas personas realmente no se toman en serio la encuesta, lo cual perjudica nuestra investigación. Hay otras personas que dicen que NO a cualquier cantidad, ya que piensan que los gastos médicos los tiene que pagar al 100% la Seguridad Social. Estas personas también dificultan nuestra investigación, ya que no nos permiten saber el valor que le dan a este problema de salud. Por ello le pedimos que se ponga en una situación como la que le indicamos, esto es, piense que vive en un país donde la malla con medicamento no la paga la Seguridad Social. Le agradecemos el esfuerzo de responder lo mejor posible.

Por último, le pedimos que, a la hora de responder, tenga también en cuenta las siguientes observaciones:

1. Si dice que está dispuesto a pagar una cierta cantidad, este dinero no lo tendrá disponible para otras cosas.

2. No piense únicamente en el dinero que podría pagar ahora, ya que hay gastos que pagamos pidiendo un crédito y los pagamos poco a poco durante un tiempo.

SECCIÓN 1

- El encuestado ha llegado a esta Sección ya que prefiere el **STENT con Medicamento,** el cual tiene como principal beneficio respecto al **STENT sin Medicamento,** el hecho que tarde más tiempo en volver a operarse.

- **Los STENT con Medicamentos** son más caros y no los cubre totalmente la Seguridad Social. Es decir, usted tendría que pagar una parte del STEN con Medicamento.

- **Los STENT sin Medicamento** lo cubre totalmente la Seguridad Social.

Recordar:

- No existe garantía total de no volverse a operarse con ninguno de los tratamientos.

Imagine que se encuentra en la situación de decidir entre un tratamiento u otro

MOSTRAR TARJETA Nº 4: SITUACIÓN 1

Lanzar P7

Nota: Recordar al encuestado que el dinero que esté dispuesto a pagar, no lo tendrá disponibles para otras cosas e incluso puede que no disponga de ese dinero ahora mismo, por lo que tendríamos que pedir un crédito para sufragar los gastos de la intervención

SITUACIÓN 1

MOSTRAR TARJETA Nº 4: SITUACIÓN 1

Suponga que el médico le dice que, si se pone la malla SIN medicamento, que no tiene para usted ningún coste, tiene un riesgo del 39% de volver a operarse. Esto es, de cada 100 pacientes que se ponen la malla que no lleva medicamento alrededor de 39 pacientes tendrán que volver a operarse al cabo de uno o dos años, ya que la arteria volverá a cerrarse y notarán otra vez los síntomas. En cambio, el médico le dice que si se pone la malla CON medicamento, tiene un riesgo del 7% de volver a operarse. Esto es, de cada 100 pacientes que se ponen la malla con medicamento unos 7 tendrán que volver a operarse al cabo de uno o dos años. Sin embargo, esto tiene un coste para usted. Por tanto, tiene usted dos opciones:

Opción A: ponerse la malla SIN medicamento	Opción B: ponerse la malla CON medicamento
Usted tiene un riesgo del 39% de volver a operarse (39 de cada 100 pacientes tienen que volver a operarse en uno o dos años)	• Usted tiene un riesgo del 7% de volver a operarse (7 de cada 100 pacientes tienen que volver a operarse en uno o dos años).

A continuación le pondremos una tabla con una cantidades de dinero que tendría que pagar y le pediremos que nos diga si cree que pagaría o no dicha cantidad.

Por tanto, nuestra pregunta es la siguiente:

P7. Suponga que si el médico le pone la malla sin medicamento el riesgo de tener que volver a operarse es del 39% (39 de cada 100) y si se pone la malla con medicamento el riesgo es del 7% (7 de cada 100).

En este caso ¿Se pondría usted la malla con medicamento si le costara X€ o preferiría no pagar ese dinero y ponerse la otra malla?

a. Me pondría la malla con medicamento y pagaría X€. → vaya a la pregunta P7.1
b. Me pondría la malla sin medicamento y no pagaría nada → vaya a la pregunta P7.2

P7.1. ¿Seguiría eligiendo la malla con medicamento si tuviera que pagar Y€?
P7.2. ¿Seguiría eligiendo la malla con medicamento si tuviera que pagar Z€

SITUACIÓN 2

MOSTRAR TARJETA Nº 4: SITUACIÓN 2

Suponga ahora que el médico le dice que, si se pone la malla SIN medicamento, que no tiene para usted ningún coste, tiene un riesgo del 34% de volver a operarse. Esto es, de cada 100 pacientes que se ponen la malla que no lleva medicamento, alrededor de 34 pacientes tendrán que volver a operarse. En cambio, el médico le dice que si se pone la malla CON medicamento, tiene un riesgo del 7% de volver a operarse. Esto es, de cada 100 pacientes que se ponen la otra malla unos 7 tendrán que volver a operarse al cabo de uno o dos años. Sin embargo, esto tiene un coste para usted. Por tanto, tiene usted dos opciones:

Opción A: ponerse la malla SIN medicamento	Opción A: ponerse la malla CON medicamento
• Usted tiene un riesgo del 34% de volver a operarse (34 de cada 100 pacientes tienen que volver a operarse en uno o dos años)	• Usted tiene un riesgo del 7% de volver a operarse (7 de cada 100 pacientes tienen que volver a operarse en uno o dos años)

P8. Por favor, mire a cada una de las cantidades que ve en la tabla e indique si cree que pagaría o no.

En este caso ¿Se pondría usted la malla con medicamento si le costara X€ o preferiría no pagar ese dinero y ponerse la otra malla?

a. Me pondría la malla con medicamento y pagaría X€. → vaya a la pregunta P8.1
b. Me pondría la malla sin medicamento y no pagaría nada → vaya a la pregunta P8.2

P8.1. ¿Seguiría eligiendo la malla con medicamento si tuviera que pagar Y€?
P8.2. ¿Seguiría eligiendo la malla con medicamento si tuviera que pagar Z€

SITUACIÓN 3

MOSTRAR TARJETA Nº 4: SITUACIÓN 3

Suponga ahora que el médico le dice que, si se pone la malla SIN medicamento, que no tiene para usted ningún coste, tiene un riesgo del 29% de volver a operarse. Esto es, de cada 100 pacientes que se ponen la malla que no lleva medicamento, alrededor de 29 pacientes tendrán que volver a operarse. En cambio, el médico le dice que si se pone la malla CON medicamento, tiene un riesgo del 7% de volver a operarse. Esto es, de cada 100 pacientes que se ponen la otra malla unos 7 tendrán que volver a operarse al cabo de uno o dos años. Sin embargo, esto tiene un coste para usted. Por tanto, tiene usted dos opciones:

Opción A: ponerse la malla SIN medicamento	Opción A: ponerse la malla CON medicamento
• Usted tiene un riesgo del 29% de volver a operarse (29 de cada 100 pacientes tienen que volver a operarse en uno o dos años)	• Usted tiene un riesgo del 7% de volver a operarse (7 de cada 100 pacientes tienen que volver a operarse en uno o dos años)

P9. Por favor, mire a cada una de las cantidades que ve en la tabla e indique si cree que pagaría o no.

En este caso ¿Se pondría usted la malla con medicamento si le costara X€ o preferiría no pagar ese dinero y ponerse la otra malla?

a. Me pondría la malla con medicamento y pagaría X€. → vaya a la pregunta P9.1
b. Me pondría la malla sin medicamento y no pagaría nada → vaya a la pregunta P9.2

P9.1. ¿Seguiría eligiendo la malla con medicamento si tuviera que pagar Y€?
P9.2. ¿Seguiría eligiendo la malla con medicamento si tuviera que pagar Z€

SITUACIÓN 4

MOSTRAR TARJETA Nº 4: SITUACIÓN 4

Suponga ahora que el médico le dice que, si se pone la malla SIN medicamento, que no tiene para usted ningún coste, tiene un riesgo del 24% de volver a operarse. Esto es, de cada 100 pacientes que se ponen la malla que no lleva medicamento, alrededor de 24 pacientes tendrán que volver a operarse. En cambio, el médico le dice que si se pone la malla CON medicamento, tiene un riesgo del 7% de volver a operarse. Esto es, de cada 100 pacientes que se ponen la otra malla unos 7 tendrán que volver a operarse al cabo de uno o dos años. Sin embargo, esto tiene un coste para usted. Por tanto, tiene usted dos opciones:

Opción A: ponerse la malla SIN medicamento	Opción A: ponerse la malla CON medicamento
• Usted tiene un riesgo del 24% de volver a operarse (24 de cada 100 pacientes tienen que volver a operarse en uno o dos años)	• Usted tiene un riesgo del 7% de volver a operarse (7 de cada 100 pacientes tienen que volver a operarse en uno o dos años)

P10. Por favor, mire a cada una de las cantidades que ve en la tabla e indique si cree que pagaría o no.

En este caso ¿Se pondría usted la malla con medicamento si le costara X€ o preferiría no pagar ese dinero y ponerse la otra malla?

a. Me pondría la malla con medicamento y pagaría X€. → vaya a la pregunta P10.1
b. Me pondría la malla sin medicamento y no pagaría nada → vaya a la pregunta P10.2

P10.1. ¿Seguiría eligiendo la malla con medicamento si tuviera que pagar Y€?
P10.2. ¿Elegiría la malla con medicamento si tuviera que pagar Z€

5ª PARTE

Como ya le hemos comentado, la intervención para colocar la **MALLA (STENT)**, no son complicadas, se suele abandonar el hospital el mismo día y normalmente se requiere un periodo de convalecencia de dos tres días. Suponga que se dispone de un método alternativo, igual de efectivo que la MALLA (STENT) con medicamento pero no hiciera falta intervención. Es decir, un tratamiento con pastillas que evitara la operación.

Por último, nos gustaría que nos contestara a la siguiente pregunta. Como le hemos explicado, cada vez que una persona tiene el problema de estrechamiento de las arterias, hay que operarla. Estas operaciones no son muy complicadas y muchas veces se suele abandonar el hospital el mismo día de la operación, ya que únicamente necesitan anestesia local pero, de todas formas, no dejan de suponer algunas molestias y requieren un pequeño periodo de convalecencia de dos o tres días.

Suponga ahora, que hubiera una forma alternativa de resolver el problema que fuera exactamente igual de buena, desde el punto de vista médico, que poner una malla con medicamento, pero no hiciera falta la operación. Esto es, suponga que hubiera un tratamiento con pastillas que le hiciera el mismo efecto que poner la malla con medicamento y, por tanto, le evitaría operarse.

Por ejemplo:

- Si se pone la malla CON medicamento, el riesgo bajaría al 10% (10 de cada 100 casos).
- Si se toma la pastilla, el riesgo bajaría al 10% (10 de cada 100 casos), igual que la malla con medicamento pero no tendría que sufrir las molestias de la intervención quirúrgica.

P11. Si usted tuviera que elegir entre operarse, para ponerse la malla con medicamento o tomar el tratamiento con la pastilla, suponiendo que las dos opciones tienen el mismo efecto, ¿qué preferiría?

Tomar la Pastilla	1
Operarme	2 → ANOTAR CAUSAS DE OPERARSE(PASAR A 6ª PARTE)

Suponga, ahora, que vive en un país donde las mallas con medicamento las cubre la Seguridad Social (es gratis) pero una parte del tratamiento con pastillas lo tiene que pagar usted.

P12. Por favor, mire a cada una de las cantidades que ve en la tabla e indique si cree que pagaría o no.

En este caso ¿pagaría por un medicamento que le evitara tener que ser operado y que fuera igual de bueno que las mallas con medicamento? Para contestar mire el siguiente cuadro e indique si pagaría o no.

a. Evitaría la operación, utilizaría el tratamiento con la pastilla y pagaría X€. → vaya a la pregunta P12.1
b. Me pondría la malla y no pagaría nada por el tratamiento con la pastilla → vaya a la pregunta P12.2

P12.1. ¿Seguiría eligiendo el tratamiento con pastilla si tuviera que pagar Y€?
P12.2. ¿Elegiría el tratamiento con pastillas si tuviera que pagar Z€?

6ª PARTE: PREGUNTAS DE ACTITUDES DURANTE LA ENCUESTA

Cuando Ud. contestó a las cuestiones sobre la suma de dinero adicional que estaba dispuesto a pagar por los medicamentos que disminuyesen su riesgo de tener el problema de salud mencionado

P13. ¿Pensó que la medicina que lleva el stent podría tener efectos secundarios?

SI	1
NO	2
NS/NC	99

P14. ¿Tuvo en cuenta sus ingresos?

SI	1
NO	2 (pase a 14.1)
NS/NC	99

P14.1 Si hubiera tenido en cuenta sus ingresos, ¿hasta cuál de estas cantidades podría pagar realmente? *Si alguna de las cantidades está entre 6.000 y 30.000, pase a 14.2*

P14.2 ¿Se ha planteado como pagaría dicha cantidad?

P14.3 Si alguna de las cantidades de P7 P8 P9 P10 P12 está entre 6.000 y 30.000, ¿Se ha planteado como pagaría dicha cantidad?

P15. En esta encuesta, le hemos hablado de un problema de salud causado por el estrechamiento de las arterias (estenosis). Indíqueme, con un número del 1 a 10, si la idea de operarse le genera miedo o ansiedad

1 2 3 4 5 6 7 8 9 10

Muy poco miedo Alto nivel de miedo

7ª PARTE: DATOS SOCIO-ECONÓMICOS

Le agradecemos mucho su amable colaboración y, ahora, tan sólo le pediríamos que contestara a las siguientes preguntas sobre sus características personales.

P16. ¿Qué edad tiene?. (Por favor escriba en números) ______años.

P17. Sexo. (Por favor ponga una ´X`).

Hombre 1 Mujer 2

P18. ¿Cuál es su máximo nivel de estudios acabados?.

(Por favor ponga una 'X').

No sabe leer ni escribir	1
No ha cursado estudios, pero sabe leer y escribir	2
Primaria Incompleta	3
EGB o similar	4
FP o similar	5
Bachillerato o similar	6
COU o similar	7
Estudios Superiores (Universitarios)	8
NS/NC	99

P19. ¿Cuál es su situación laboral?

Trabaja	1
Parado/a	2
Labores del hogar	3
Jubilado/a	4
Estudiante	5
Incapacitado/a	6
Otros.	7

P20. ¿Cuántos miembros tiene la unidad familiar? _______________

P21. ¿Podría decirme cuál de estas cantidades se aproximan mejor a los ingresos netos familiares al mes?

EN EUROS

No tiene ingresos directos	1
Hasta 300 € por mes	2
301-600 € por mes	3
601-900 € por mes	4
901-1.200 € por mes	5
1.201-1.500 € por mes	6
1.501-1.800 € por mes	7
1.801-2.100 € por mes	8
2.101-2.400 € por mes	9
2.400-3.000 € por mes	10
3.000-4.500 € por mes	11
4.500-6.000 € por mes	12
Más de 6.000 € por mes	13
No responde	99

Municipio: ____

Distrito: ____

Barrio: ____

Entrevistador/a: ____

Día: ____

Control: ____

P22. ¿Quiere añadir alguna sugerencia o comentario al tema de la encuesta?

____

____

____

Nos hacen un control de calidad de las entrevistas, y un supervisor llama a algunas personas entrevistadas para saber cómo ha ido la encuesta. ¿Le importaría darnos su número de teléfono, por si decidieran llamarlo?______________________